# The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXVII, NEW YORK, THURSDAY, MAY 12, 1904. No. 19.

THE ENGINEERING AND MINING JOURNAL. ESTABLISHED 1866

PUBLISHED EVERY THURSDAY,

261 BROADWAY, NEW YORK

TELEPHONE 6865 CORTLAND. P. O. BOX 1833.
CABLE ADDRESS "ENGMINJOUR" NEW YORK.

T. A. RICKARD . . . . . EDITOR
FREDERICK HOBART, SAMUEL SANFORD . . . ASSOCIATE EDITORS

SPECIAL CONTRIBUTORS.

NEW YORK . . . . . R. W. RAYMOND, J. PARKE CHANNING, JOHN A. CHURCH, ROBERT T. HILL, JOSEPH STRUTHERS
BOSTON . . . . . W. R. INGALLS
PHILADELPHIA . . . . . F. LYNWOOD GARRISON, R. A. F PENROSE, JR.
ANSTED, W. VA. . . . . W. N. PAGE
WILKES-BARRE, PA. . . . . ROBERT V. NORRIS
WASHINGTON . . . . . S. F. EMMONS, EDWARD W. PARKER, J. E. SPURR, W. H. WEED
DENVER . . . . . PHILIP ARGALL, CHESTER W. PURINGTON
SAN FRANCISCO . . . . . R. GILMAN BROWN, LOUIS JANIN, JR., CHARLES G. YALE
LONDON . . . . . A. G. CHARLETON, HENRY F. COLLINS, J. H. CURLE, T. KIRKE ROSE
SOUTH AFRICA . . . . . T. LANE CARTER, G. A. DENNY
AUSTRALIA . . . . . DONALD CLARK, F. DANVERS POWER

HORACE M. SWETLAND . . . . . PRESIDENT
J. T. MORRIS . . . . . MANAGER AND TREASURER

BRANCH OFFICES:

CHICAGO, Tel: Harrison 3326 . 520 Monadnock Block
PITTSBURG, Tel: 504 Court . 701 Keystone Building
DENVER . . . . . 206 Boston Building
SALT LAKE CITY . . . . . 662 Main Street
BUTTE, MONTANA . . . . . 19 & 20 Owsley Block
SAN FRANCISCO . . . . . 168 Crocker Building
LONDON, ENGLAND . . . . 30 Bucklersbury, E. C.
DORTMUND, GERMANY . . . . Arndt Strasse, 56

SUBSCRIPTION, payable in advance, $5.00 a Year of 52 numbers, INCLUDING POSTAGE in the UNITED STATES, CANADA, MEXICO, CUBA, PORTO RICO, HAWAII or the PHILIPPINES.

To FOREIGN COUNTRIES, INCLUDING POSTAGE, $8.00 or its equivalent: 33 Shillings; 32 Marks; or 40 Francs.

NOTICE TO DISCONTINUE
Should be WRITTEN to the New York Office in every instance.

Copies are on sale at the news-stands of the following hotels:—Waldorf-Astoria, New York; Brown Palace, Denver; Palace Hotel, San Francisco, and the leading hotels in the principal cities.

ADVERTISING COPY
Should reach NEW YORK office by MONDAY morning of issue week; CHANGES OF COPY by the PRECEDING THURSDAY.

Copyright, 1904, by
THE ENGINEERING AND MINING JOURNAL.
Entered at New York Post Office as 2nd Class matter.

## CONTENTS.

Editorials:
Notes ..... 751
Secret Reserves ..... 752
Pyrite Smelting ..... 752
Coal Dust as a Factor in Mine Explosions.... 753
Copper Prices ..... 753
Market Conditions ..... 754
Metallics ..... 754
The Mexican Geological Society..... 754

Discussion:
Engineers as Presidents.....*John A. Church* 755
The Training of Chemists.....*M. A. Sears* 755
The Elimination of Impurities from Copper, *C. M. Schwerin* 755
Ores from Igneous Magmas..*F. W. Carnahan* 756
Radium in Uranium Compounds, *B. B. Boltwood* 756
The Deposition of Ores from an Igneous Magma .....*Robert Stevenson* 756
*Pyrite Smelting in Norway.....*E. Knudsen* 757
*Mining Litigation in British Columbia..... 758
*A Correction—Rock Drill Bits..... 758
*The Silver Peak Region, Nevada, *J. E. Spurr* 759
Mining Methods at Bingham..... 760
Secret Reserves.....*F. H. Bathurst* 761
*Dredging for Platinum in the Ural Mountains, *C. W. Purington* 762
West Virginia Coal Mines..... 764
Cyanide in the Stamp Mill..... 765
*The Alsek Mining District.....*W. M. Brook* 766
Petroleum Production of Russia..... 767
Rock Drill Tests..... 768
*The Krause Atmospheric Stamp..... 769
Recent Literature on Economic Geology—XIII. Lead and Zinc.....*H. Foster Bain* 770
Books Received ..... 770
Books Reviewed ..... 770

Correspondence:
Origin of Placer Gold in California, *W. E. Thorne* 771
*The Science of Burning Liquid Fuel, *W. N. Best* 771

Abstracts of Official Reports:
Sloss-Sheffield Steel & Iron Company..... 772
Questions and Answers..... 772
Recent Decisions ..... 773
Patents Relating to Mining and Metallurgy:
*United States ..... 773
Great Britain ..... 774

*Illustrated.*

### DEPARTMENTS.

Assessments ..... 788

Chemicals and Minerals:
New York ..... 786
Foreign ..... 787

Coal Markets:
United States ..... 784
Foreign ..... 785
Dividends ..... 788

Financial Notes:
Gold and Silver Movement..... 787
Prices of Foreign Coins..... 787
Industrial Notes ..... 777

Iron and Steel Markets:
United States ..... 785
Foreign ..... 786

Metal Markets:
Silver ..... 787
Copper, Tin, Lead, Spelter and Minor Metals. 788
Average Monthly Prices Tables..... 788

Mining News:
Summaries: Denver, Duluth, San Francisco. London, Monterey, Perth, Toronto, Victoria .....775, 776
United States ..... 778
Foreign ..... 782

Mining Stocks:
Market Reviews ..... 783
Quotations .....789, 790
Obituary ..... 777
Personals ..... 777
Schools, Technical ..... 777
Societies ..... 777
Trade Catalogues ..... 778

## EDITORIAL.

THE COUNCIL OF the Transvaal Technical Institute has made an offer to the dean of the Royal School of Mines, in London, to accept three or four graduate students for a post-graduate course at Johannesburg. The Rand Mines, Ltd.—a company representing a great consolidation of mining interests—has generously offered to provide small salaries for these students during the term of their post-graduate course at the mines. The completion of this arrangement is largely due to the patient effort of Mr. Hennen Jennings, a California engineer of South African experience and a professional spirit which ignores the limitations set up by political boundaries.

IT IS ANNOUNCED at Washington that our 'special contributor,' Mr. Chester W. Purington, of Denver, has been engaged by the United States Geological Survey to investigate placer-mining methods in Alaska. As a result of his work during the coming summer, Mr. Purington will prepare a report which is sure to afford a great deal of information of a most useful kind.

WE HAVE RECEIVED a large number of enquiries concerning the Associated Security Company, of this city, which is starting out to prepare a register of expert mining engineers. Registration is secured by invitation and by payment of an annual fee. The company undertakes to act as a New York reference for out-of-town professional men and expects to carry out the investigation and sale of mines. It is not our desire to advertise this undertaking by these explanations, but we have been asked by many readers to state whether the company is respectable or merely a snare for the unwary. On inquiry we can state that the organizers are reputable men, some of whom are known to us. Whether such a register of mining engineers fills any long-felt want and whether it can well be made a part of a mine promotion company, is quite another matter. We naturally believe that the 'Professional Directory' appearing in our advertising pages serves as a representative list of the active men in the mining and metallurgical professions.

WE ARE AMUSED to note that our London contemporary, *The Financial Times,* apropos of some sensible remarks made by a West Australian director, undertakes to emphasize the fact that individual mines eventually become exhausted, and says, "as we have so often pointed out in regard to the inevitable end of all mines—'Even Methuselah died!'" Here in New York the daily financial chronicle above quoted has scarcely succeeded in bringing home any such impression, but on the contrary, the teaching of its comment on mining enterprises has been that some would come to an end and that others would not. The phrase quoted was first used in the editorial columns of this JOURNAL on May 2, 1903, and has been frequently quoted, chiefly in disagreement, by another lively contemporary of ours, *South African Mines,* at Johannesburg.

---

ACCORDING TO THE annual report of the Daly-West Mining Company, recently published in the JOURNAL, its dressing works milled 76,240 dry tons of ore in 1903, an average of 237 tons per day, the mill having been in operation 321 days, which is a very high working time. The ratio of concentration was 4.6 to 1. The production of concentrates was 16,580 dry tons, which averaged 31.4 per cent lead, 2 per cent copper, 7.7 per cent zinc, 53.88 oz. silver and 0.04 oz. gold. The average assay of the tailings was 0.319 per cent lead and 4.046 oz. silver. The saving of values was 72.3 per cent of the silver and 97.9 per cent of the lead. Probably so high a saving of lead value has never been elsewhere attained. The high perfection of the Daly-West milling practice is due especially to the skill and ingenuity of Mr. E. W. Sherman, the mill superintendent.

---

THE FINAL BREAK in the Ore Association, which occurred at the Cleveland meeting last week, makes it certain that the market for Lake Superior iron ores this season will be an open one. At the previous meeting in New York an agreement had been reached for a substantial reduction in prices, those settled upon for the coming season being, for bessemer old-range ores not to exceed $3.50 per ton, f. o. b. Lake Erie ports; non-bessemer old range, $2.85; bessemer Mesabi, $3.25; non-bessemer Mesabi at $2.65 per ton. This scale shows a reduction of $0.75 to $1 per ton, last season's prices having been based on $4.50 for bessemer old range ores and $4 for bessemer Mesabi.

The final disagreement was not on prices, but on the question of restricting output. The independent producers felt that too much was asked from them, and absolutely refused to make the concessions proposed.

From present indications, the demand for ore will not be very heavy, and the consequences of the break will not be serious. The merchant furnaces, however, will be placed in a better position, with regard to the big steel companies, than they would have held under a restriction agreement; a point which they will doubtless appreciate.

---

IN A RECENT ISSUE we published an interesting contribution by a Mr. A. J. Macyeage and the Australian mail has been burdened with a polite letter to a gentleman so designated. By an accident we have now learnt that our contributor is Mr. Macgeorge, but in all sincerity we are compelled to state that while the latter is his name, the former is unquestionably his signature. We apologise to Mr. Macgeorge for failing to guess that Macyeage stood for Macgeorge, because it is now as obvious as a puzzle the solution of which has been given, that, of course, that was the name. However, the error will not detract from the usefulness of his contribution, and it may suggest to our friends that when their communications have no printed letter-head, it is imperative that they should sign legibly or give their characteristic signature and then spell it out underneath. It is not realized often enough that, while there are some rules for ordinary spelling, there are none whatever for the spell-of a name, because a man is entitled to spell his own name just as he pleases; therefore, when the writing is illegible, as is amusingly the case with our French friends, for example, it becomes almost impossible, on the theory of averages, the doctrine of probabilities, or any other method of guessing, to determine what the distinguished but indistinguishable caligraphy means. It is for this reason mainly and to indicate the position of the writer, that the printed letter-head is used in the United States.

---

## SECRET RESERVES.

The article on this subject, elsewhere in this issue, by a writer so well known in Australia as Mr. F. H. Bathurst, is sure to be read with interest. Apart from its local interest, the question discussed involves many of the nice points of company management and the responsibility which is inseparable from such management. When secrecy of any sort becomes a lever opening the way for successful share speculations on the part of those in a position of trust, it is bad—unqualifiedly bad—because it means not only that investors are left in ignorance of essential facts, but it involves a positive danger to the *moral* of the staff in control of operations at the mine. A directorate which practises deception toward its shareholders must expect like treatment from its manager, and he in turn must not be surprised if members of his staff pursue similar tactics. "Don't monkey with a buzz-saw." To play with a code of honorable conduct is to undermine the very basis of business, and more particularly is it essential that above-board procedure should be the constant aim of those who wish to establish confidences in the speculative industry of mining.

---

## PYRITE SMELTING.

In connection with the successful discussion on this interesting subject in this JOURNAL, we take pleasure in announcing that Dr. Edward D. Peters, the distinguished authority on copper smelting, has agreed to prepare an extensive review of the articles which have appeared in our columns, and this review will be published at an early date.

Before closing the discussion we invite further contributions. One matter on which more light is required is the consumption of fuel; to this end we would ask if any of our professional friends have been able to calculate a relative consumption of carbon when adding fuel to the charge in the furnace, consuming carbon in heating the blast, or consuming carbon when increasing the volume and raising the pressure of the blast? In other words, is it cheaper to expend fuel on the blast before it enters the furnace or to employ fuel direct in the smelting operation? Obviously, to a large extent, this, like the tariff, will be a local question and will depend upon the cost of fuel and the relative amount required by different ores; but however put, this is the main question at issue between the metallurgists who employ pyrite smelting; or as Mr. Ingalls has put it: "What is the cheapest way of getting rid of your sulphur?"

In this connection it is a question whether the extremely small proportion of carbonaceous fuel used in pyrite smelting does indeed take any physical part in keeping the charge open to the passage of furnace gases; on the other hand, it is certain that the minute you increase the percentage of coke in raw smelting you are apt to fuse the charge too quickly and prevent oxidation of the iron, the result being a liability to an extremely silicious slag or else a silicious skeleton in the furnace, which means a freeze-up.

As regards the heating of the blast, we can state that at a well-known establishment treating raw nickel-copper pyrrhotite, under varying conditions of charge, with roasted and raw ore, and from 8 per cent down to 3 per cent coke, it was found that the grade of the matte was not appreciably higher when the cold blast was used. The ores contained 3 per cent copper and 3 per cent nickel, and a concentration only of from 4.5 to 6 into one was desired. The blast temperature was 500° C. The metallurgist in charge came to the opinion that hot blast was advisable, but that direct smelting was extremely hazardous because the furnace "was likely to quit without notice," in other words, freeze up. He concluded that heap roasting and rapid smelting were preferable to double smelting with hot blast. But he had a bad ore to treat. Processes were made after ores were fashioned.

During the progress of the discussion a practical and forcible comment upon it has been offered by the decision, after proper trials, of the Tennessee Copper Company to discard the practice of heap-roasting preliminary to smelting, and to smelt the raw ores. Until lately the low costs achieved by Mr. Heywood had enabled the advocates of preliminary roasting as against straight pyrite smelting to quote the costs in Tennessee against those at Mt. Lyell, because Mr. Heywood's costs were $1.8296 per ton less than those of Mr. Sticht, who omitted roasting and employed double smelting with hot blast. But this comparison is no longer effective.

## COAL-DUST AS A FACTOR IN MINE EXPLOSIONS.

According to the verdict of the coroner's jury, the terrible explosion at the Harwick mine last January was due to a windy shot igniting fire-damp and coal-dust in the mine air. The flame spread through the workings and killed all but one of those at work underground. The facts, as given in the JOURNAL at the time of the accident, particularly the large amount of white-damp, or carbon monoxide, in the air, which delayed the work of rescue and killed the leader of the rescuing party, Selwyn M. Taylor, indicated that dust was a prime factor in the disaster.

The verdict calls attention again to the role of coal-dust in mine explosions. Most of the great coal-mining disasters in this country during the last six years—Castle Gate in Utah, Red Ash in West Virginia, and Harwick in Pennsylvania—were wholly or in part due to dust. In some Pennsylvania anthracite mines, explosions of gas are common, but dust explosions are practically unknown in that region. This is largely because anthracite contains little volatile matter, and its dust does not carry the flame of an explosion; the particles in the mine air glow when heated, but do not flash.

Bituminous coal-dust greatly increases the sensitiveness of a mixture of air and fire-damp, the latter being chiefly methane. Where no dust is present the smallest proportion of fire-damp making an explosive mixture is 5.5 per cent; but where much dust is present, as little as 1 per cent of fire-damp, an amount that cannot be detected by an ordinary safety lamp, may cause an explosion. Besides thus increasing the sensitiveness of an air and gas mixture, dust enormously increases the possible radius of an explosion, by the flash of the volatile matter driven out of each dust particle, so that, as at Harwick, the flame may spread through the whole mine. In addition, dust greatly increases the possible loss of life, and may prevent attempts at rescue through the amount of carbon monoxide generated.

The products of the complete combustion of marsh-gas and air are water and carbon dioxide; the latter, while suffocating, is not poisonous; men can work without danger in an atmosphere containing 3 or 4 per cent of it, and severe discomfort is not felt by a miner until the proportion reaches 10 per cent. In explosions of fire-damp with dust, the dust is not consumed, the flame being from the volatile matter in the dust. The glowing particles reduce the dioxide to monoxide, consequently the proportion of the latter in the after-damp of such explosions may be considerable. Carbon monoxide is extremely poisonous. The red corpuscles of the blood have a chemical affinity for it about 250 times as great as their affinity for oxygen, and as soon as the corpuscles are saturated with the monoxide, they will take up no more oxygen; then no oxygen can find its way into the tissues of the body, and death must result. If the blood be saturated to 50 per cent with the monoxide, unconsciousness follows, hence the presence of 0.2 per cent of the gas in mine air is dangerous; death is likely to follow working but half an hour in air containing 0.3 per cent, while air containing 1 per cent produces unconsciousness in five or six minutes.

Admitting the danger from the presence of bituminous coal-dust in mine air, the removal of this danger is not an easy matter. The two methods advocated for minimizing the danger are, first, a sufficient ventilating current to dilute fire-damp in all places where men may go and prevent its accumulation even in small amounts; and, second, the liberal use of sprinklers to lay the dust on roads and airways, with a thorough wetting of the working faces before shot-firing. These precautions, however, will not remove all danger for several reasons; in the first place, it is almost impossible to keep the percentage of fire-damp at all places in a fiery mine below the small proportion detectable by the ordinary safety lamp; in the second place, the endeavor to get an ample air supply to all working faces in a large mine means a high velocity for the air current, thus conveying the dust a long distance and increasing the danger zone. Nor is sprinkling a positive preventive, even to the extent of wetting the coal at each working face before shot-firing. It is a comparatively easy matter to wet down the floor of a section of a gangway, but in a recent discussion of dust prevention in England the point was made that there was nothing to show that the thorough sprinkling of a section of an air-way would keep the flame of a heavy explosion, like the discharge of a cannon, from passing through the section. The sprinkling of the entire length of each main haulage road is objectionable for several reasons. Theoretically, the correct way to prevent an explosion from spreading through the medium of dust is to saturate the mine air so that each particle of dust will be coated with moisture, but the saturation of air in a mine, where the main air-way may be passing 200,000 cu. ft. per minute, is practically out of the question, to say nothing of the effect on miners working in such an atmosphere.

The question, therefore, is not one of absolutely preventing but of minimizing risks, and it is extremely doubtful if the average State legislature is likely to act effectively. Clearly there is need, even in Pennsylvania, of stricter provision against dust, but the present mining laws of that State, excellent in some respects, contain clauses that are inequitable and even meaningless. There is little reason to believe, judging from the record of the past few years, that legislation, passed through the influence of miners' unions, will suffice. Possibly the best way of dealing with this and allied matters is not to try to enact statutes that will cover every possible contingency in mining operations, but simply a law that will put the proof of negligence in mine accidents on the employer rather than on the employee, leaving the companies—which will then have to pay a higher price for mismanagement—to solve the problems directly affecting their profits and the safety of their men.

## COPPER PRICES.

With reference to our recent article on metal prices, it is of interest to compare the average prices obtained for copper by different producing companies during 1903 with the average for the year, as shown by the market reports of the JOURNAL. The following table shows the figures given by a number of the Lake companies, which have published their reports for the year, in cents per pound:

| | | | |
|---|---|---|---|
| Atlantic | 13.120 | Osceola | 13.110 |
| Baltic | 13.431 | Quincy | 13.123 |
| Champion | 13.370 | Tamarack | 13.020 |
| Isle Royale | 13.120 | Trimountain | 13.216 |
| Mohawk | 13.110 | Winona | 13.489 |
| ENGINEERING AND MINING JOURNAL average.. | | | 13.417 |

It will be seen that only two of these companies—the Baltic and the Winona—obtained a higher average than that reported by the JOURNAL; the difference in one case being 0.014 cent, and in the other 0.072 cent. Of course, it may happen in the case of any one company, that a large part of its copper might be sold at a time when lower prices ruled, and that it was not in a position to take advantage of the best prices. In this way, the average would be reduced. A comparison extending over a whole year, however, for a number of companies, is a fair one.

For electrolytic copper, we have not as yet the material for an extended comparison, as only two reports giving average sales for 1903 have been received. The JOURNAL's average price for electrolytic copper for the year was 13.235 cents. One of the companies reporting—the Calumet & Arizona—gives the average of its sale at 13.088 cents; the other—the Tennessee Copper Company—at 12.980 cents. The Tennessee metal, however, is not marketed as electrolytic, but as a high-grade casting copper.

The facts thus presented hardly require any further comment.

## MARKET CONDITIONS.

May 11.

The markets generally have been very quiet, and on all sides there is a disposition to wait for further developments.

In copper, domestic consumers seem to be taking little interest, and foreign orders have fallen off somewhat. Prices are a little easier, but with no marked change.

Tin has fluctuated as usual during the week, but the recent tendency has been downward.

Lead is unchanged in price. Consumption continues fair. The foreign market is somewhat lower. In manufactured lead goods, especially white lead, an active competition is developing between the National Lead and the United Lead companies, the result of which it is difficult to foresee.

Spelter is a little easier, and demand has been rather light. The Joplin ore market shows little change.

Silver is a little higher under the influence of better buying for the East.

The iron markets are dull, the only business reported being in small quantities for short deliveries. There are some reports of cutting in prices, which, however, can hardly be traced to any definite source; although they are probable under the circumstances. The break-up of the Ore Association has had little effect, as the reduction in prices for lake ores had been generally expected. There is again a rumor that prices of steel rails will be reduced, but, in this case also, no particular basis is apparent. The railroads are still holding back.

The western coal markets are still upset by the delay in opening lake navigation. The lower lake ports are all congested with coal, and railroads are refusing to take any more for those ports until the docks are cleared.

Sales of anthracite coal continue very satisfactory, and purchasers are taking full advantage of the discount which is still in force. The April production was a little over 5,400,000 tons.

The Atlantic seaboard bituminous trade continues quiet, with no apparent change.

## METALLICS.

**Culled from all sources. Our readers are invited to assist this department by sending similar material.**

A true theory of social progress is not a cause of movement, but is simply oil to the movement—serves simply to remove friction. The force producing the movement is the aggregate of men's instincts and sentiments, and these are not to be changed by a theory.

The successful introduction of the cyanide process has marked an era in the history of gold mining, not only by increasing the profits and diminishing risks to the investor, but by bringing into the industry a large number of professional men who take positions second to none in technology and finance.

'Fitcher' is a Cornish mining term meaning to operate a drill so that it makes a wedge-shaped cavity in which the drill will stick. Probably from the French *ficher,* to fix.

To invent a new process and perfect it technically is one thing—to make it financially a success is an entirely different affair. Inventors are too often deficient in qualifications for managing their own business.

The fact that gold and silver could be dissolved from ores by a cyanide solution did not add anything to metallurgical knowledge, but the introduction of zinc in the form of fine shavings for precipitating the precious metals rendered that fact of great economic value.

Caustic lime is generally employed in the cyanide process, as it protects the cyanide, but it is not as good a coagulating substance as other compounds of calcium—such as the carbonate, chalk. Magnesia may be employed, but a large quantity is needed.

The process of causing a liquid to pass through a porous medium, such as sand, is termed percolation, and when the liquid, as it percolates, dissolves some of the former medium, it is said to leach.

The amount of moisture retained by a leached ore depends on the size of the particles, the uniformity of texture, air pressure and temperature, and to some extent on the depth of the column.

A high temperature has a marked effect in accelerating percolation, because the chief resistance offered to a solution in passing through the ore is internal friction, and this is reduced by increase of temperature.

It is usual in the cyanide process to regard the solution as consisting of potassium cyanide, whereas in reality it is a mixture of a number of substances which form a solution of a very complex nature.

In the absence of reducing agents, oxygen absorbed from the air slowly oxidizes the cyanide to cyanate or cyanic acid. In working solutions, traces of reducing agents are nearly always present, so that the loss from this cause is very small.

Potassium nitrate is formed whenever animal or vegetable remains come in contact with rocks that weather easily. India supplies the bulk of the world's demand and produced 11,130 long tons in 1902.

Among the sedimentary rocks, slate has the most diversified uses. It is used for roofing purposes, as well as in large slabs for billiard-tables, cisterns, steps, etc., and for minor purposes, such as school slates and pencils, and pulverized as cement and paint. The best slate is obtained from North Wales, where it has been worked since the 16th century. Three-fifths of the Welsh slate is produced from open quarries, and two-fifths from underground workings. Extensive quarries also exist in the United States and several other countries.

## THE MEXICAN GEOLOGICAL SOCIETY.

By an Occasional Correspondent.

On February 15, this year, circulars of invitation to become charter members of '*La Sociedad Geologica Mexicana*' were issued by the prominent geologists of Mexico to about 200 geologists, mining engineers and other scientific men throughout the Republic. This circular proposed certain articles to be incorporated in the constitution of the society at its first meeting and suggested the following distinguished men as its first officers: For president, Dr. José G. Aguilera, now director of the *Instituto Geológico de Méxicó*—a department of the government under the secretary of industrial encouragement (*fomento*); for general secretary, Dr. Emilio Böse, author of the Institute bulletin on 'The Geology of the Orizaba Region' and a description and study of 'The Earthquakes of Zanatepec, Oaxaca, of September, 1902'; for treasurer, Sr. Juan D. Villarello, joint author with Dr. Böse of a bulletin on 'The Iron Beds on the Vaquerías Hacienda, State of Hidalgo.' Besides these three scientists the originators of the society include Srs. R. Aguilar y Santillan, Ernesto Angermann, Teodoro Flores, Ezequiel Ordoñez, Ramiro Robles and Faustino Roel.

The articles of the constitution propose that the society shall have its headquarters in the city of Mexico; that it shall encourage the study of geology and kindred sciences in their relations to mining, agriculture and the industrial arts; that it shall be composed of active and associate members without restriction as to numbers or nationality; that the fee of active members shall be $1 per month and that of associate (or 'protectorate') members shall not be a fixed sum, but shall not be less than that of the active members; that the society shall publish bulletins and reports of the works of the members and also that of persons not members, when such work is considered of real utility and has been passed upon by a council elected by the members for that purpose; that its publications shall be distributed gratutiously to all members and shall be sold to the public at cost and exchanged with publications of other similar societies; that an ordinary session shall be held once every month in Mexico City and an extraordinary session once a year in some city of the Republic previously designated by the council.

The need of such a society was well expressed by the immediate and hearty response to this invitation, which assures the success of the society.

The society is a natural development of the scientific and commercial requirements of Mexico. It is an outgrowth of the government department of geology, known as the 'Geological Institute of Mexico,' which has published some excellent bulletins, such as 'The Fossil Fauna of the Catorce Mountains,' 'Physical Geography and Geology of the Peninsula of Yucatan,' 'The Pachuca Mineral Region,' 'Real del Monte Region,' 'The Rhyolites of Mexico' and 'Mineralogy of Mexico (arranged systematically and geographically).'

The geology of Mexico is very complicated and difficult of study, for the reason that the rocks are decomposed to great depths, and the greater part of the surface is entirely covered by the residual soil which the small amount of rainfall has been unable to remove.

The society has a splendid field to work in and should be of great public service.

## DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

### ENGINEERS AS PRESIDENTS.

*The Editor:*

Sir.—Your editorial on 'Professional Responsibility' in the JOURNAL of April 28 is interesting as an exhibition of the gradual growth of a sane method of mine management in England, that is, by entrusting it to well-known mining firms who can be expected to act with uprightness in case of disappointment. I doubt if this system will be copied in this country, for it is extremely rare that the methods of foreigners are copied in detail here, though the principles that underlie the methods may have a different development. As I watch the development in American mining I am impressed by the tendency to employ mining engineers of technical training, and subsequent experience, as presidents of mining companies. The movement has not spread very far as yet, but the results obtained from the examples we have are so remarkably good that I look forward to the time when it will be the rule among legitimate investors in mines to commit the conduct of their business to mining engineers, and it is in this form that I expect the lessons of English experience to be carried out in America.

The day has long gone by when the mining engineer had the reputation of being a distant and awful representative of abstract science without business sense. I do not care to make this note personal, otherwise I could mention professional mining engineers who have done distinguished service as presidents of gold, copper and iron companies, services that no men without their technical training and experience as subordinates in the field of action could possibly have rendered.

The opposite kind of president, the man who has made money in business or speculation, and for that reason is chosen to conduct the affairs of an important mine, is too often a spectacle of what ignorance and vanity can produce. I know one who, after being persuaded that his ore needed concentration, sent down a jaw-breaker and a Frue vanner as the sole components of the mill! I was called in at one time in solemn conference to determine whether a certain ore was suited to pyritic smelting, and when I pointed out that it contained more than 90 per cent quartz and not over 3 per cent sulphur, the president informed me that one of the thick-and-thin advocates of pyritic smelting had said *his* furnace could not treat the ore, but that he (the president) had been reading Peters' book, and he thought it could! I have sat by the hour and labored with the president of one of the finest mines in America to make him believe that the property was worth anything, and in vain. Like many other engineers, I could a tale unfold, if professional restrictions did not prevent. I have found that no experience in business or manufacturing is certain to keep a man from folly, when he undertakes the responsibility of a mining company. Almost always he begins by the creditable determination to get at the bottom of the business, but it is rare that he allows more than three months for this achievement. Too often he pursues his end by buying books on geology, smelting and milling and then becomes an expert in a night, and an expert of a dogged confidence in his knowledge which puts to shame the calm confidence of men who, after learning what books contain, have given years to the wider education of actual practice.

Every consulting engineer of experience knows how difficult it is for the active superintendent to convey by letters, even when supplemented by maps, a true conception of the conditions at the mine. The statements that one hears from presidents, supported as they think by letters from the mine, are something awful to remember. There are exceptions, but the few presidents who exhibit sense and understanding in their positions are those who have had years of experience. I could give the names of such men, but it is not necessary, for presidents of that kind are among the best known men in the mining business.

The conclusion of all this is, that I advise all mining companies to elect mining engineers to the office of president, a step which will give them not only intelligent direction of their affairs, but the advantage of consulting advice from the most advantageous standpoint. The requirement that a director must be a stockholder is satisfied so easily that it will be no obstacle. The extra expense will be nothing, for the right man can be obtained for the same salary that is now paid usually to the man without knowledge.

JOHN A. CHURCH.

New York, May 2, 1904.

### THE TRAINING OF CHEMISTS.

*The Editor:*

Sir.—I was much interested in reading the abstract of Mr. Herreshoff's paper in your issue of April 21 on 'The Training of Technical Chemists,' but think the article will bear discussion.

I cannot altogether agree with the author regarding the use of the term, 'technical chemist,' for I can conceive a marked difference between a technical chemist and a chemical engineer. The former would designate a man who made it a specialty to analyze technical products, while the latter would be found in charge of manufacturing enterprises involving the use of chemicals.

It is true, as Mr. Herreshoff says, that it is a mistake for the average graduate in chemistry to undertake the management of a manufacturing plant since his education and training has had nothing to do with the care and maintenance of machinery. The author's plea for a course in chemical engineering is well founded, but in assuming that none of the colleges have such a course he must be ignorant regarding the instruction given at the Massachusetts Institute of Technology, where there is a most excellent course which has been established for some years in chemical engineering, and which, as stated in their catalogue, "is designed to meet the needs of students who desire to obtain such training in mechanical engineering and chemistry, as will enable them to deal successfully with problems of construction, operation and maintenance in connection with manufacturing processes involving chemical principles."

This course includes a careful training along the lines mentioned as requisite in the above-named paper.

MORTIMER A. SEARS.

Mineral, Va., April 27, 1904.

### THE ELIMINATION OF IMPURITIES FROM COPPER.

*The Editor:*

Sir.—Recently, while looking over a paper on 'The Elimination of Arsenic, Antimony and Bismuth from Copper,' presented by Mr. Allan Gibb at the New Haven meeting of the American Institute of Mining Engineers, October, 1902, it occurred to the present writer that the results of some laboratory experiments made by him several years ago might be of interest.

The ore tested was practically a pure pyrite containing chalcopyrite, with the addition of mispickel (arsenopyrite) to introduce the requisite amount of arsenic. The samples used in the first two experiments were prepared by passing the ore and the mispickel separately between 12 and 20-mesh sieves; the two were then thoroughly mixed. The samples used in the last two experiments were prepared by mixing the coarse mispickel with the coarse ore, and then crushing the mixture so as to pass a 60-mesh sieve. After passing through it was thoroughly mixed.

The roasts were conducted in Oren furnace No. 4, made by the American Gas Furnace Company. Two pounds of ore were used for each roast; this gave a layer of ore 0.375 in. deep in a cast-iron pan measuring 4 in. by 13.5 in. by 0.75 in. During the roast the ore was rabbled every 15 minutes. For taking temperatures a Le Chatelier pyrometer was employed. The ends of the couple were enclosed in a porcelain tube, which rested directly in the ore.

Samples were taken hourly; each one weighed from 30 to 40 grams and was, in each case, made up by taking a little from one place and then from another, so as to obtain as nearly a representative sample as possible. Below are tables showing results of the experiments:

| Sample. | Temperature in degrees Centigrade. | Per ct. sulphur. | Per ct. copper. | Per ct. arsenic. | Per ct. arsenic, compared to copper. |
|---|---|---|---|---|---|
| **Experiment No. 1—** | | | | | |
| Original ..... | 15 | 46.6 | 1.63 | 0.12 | 7.36 |
| After 1st hour | 400 | 43.2 | 1.65 | 0.11 | 6.67 |
| " 2nd " | 520 | 7.7 | 2.25 | 0.14 | 6.22 |
| " 3rd " | 700 | 1.4 | 2.35 | 0.14 | 5.96 |
| " 4th " | 870 | 0.6 | 2.40 | 0.14 | 5.83 |
| **Experiment No. 2—** | | | | | |
| Original ..... | 15 | 46.6 | 1.63 | 0.12 | 7.36 |
| After 1st hour | 415 | 44.3 | 1.68 | 0.14 | 8.30 |
| " 2nd " | 630 | 38.4 | 1.85 | 0.09 | 4.87 |
| " 3rd " | 710 | 20.9 | 2.20 | 0.09 | 4.09 |
| " 4th " | 725 | 6.4 | 2.30 | 0.07 | 3.04 |
| " 5th " | 845 | 2.5 | 2.40 | 0.02 | .83 |
| **Experiment No. 3—** | | | | | |
| Original ..... | 15 | 48.2 | 1.10 | 2.45 | 223.7 |
| After 1st hour | 450 | 36.8 | 1.45 | 1.59 | 109.6 |
| " 2nd " | 610 | 13.1 | 1.60 | 0.33 | 20.6 |
| " 3rd " | 730 | 2.2 | 1.78 | 0.35 | 19.6 |
| " 4th " | 855 | 1.4 | 1.75 | 0.30 | 17.1 |
| " 5th " | 870 | 0.5 | 1.78 | 0.34 | 19.1 |
| **Experiment No. 4—** | | | | | |
| Original ..... | 15 | 48.2 | 1.10 | 2.45 | 223.7 |
| After 1st hour | 400 | 40.5 | 1.35 | 2.63 | 194.8 |
| " 2nd " | 525 | 15.6 | 1.65 | 0.43 | 26.0 |
| " 3rd " | 710 | 1.0 | 1.80 | 0.43 | 23.8 |
| " 4th " | 860 | 1.0 | 1.78 | 0.44 | 24.7 |

It will be seen from the table, that in experiment No. 1 about 20 per cent of arsenic was eliminated, and in experiment No. 2 almost 90 per cent. In experiment No. 3, 90 per cent was volatilized, and in experiment No. 4, almost the same; but it will be noted that a considerable proportion still remains behind when the large amount present in the unroasted ore is taken into consideration. From experiments Nos. 1, 3 and 4, it would appear that after a certain point no amount of increased temperature or additional time of heating will further eliminate arsenic. This is probably due to the remaining arsenic having formed metallic arsenates, which are fixed, non-volatile compounds. In experiment No. 2 the conditions of the roast were apparently the proper ones to

prevent the formation of arsenates, thus allowing the arsenic to volatilize.

Of course, from a few limited laboratory experiments no rules can be deduced, but it would be of interest to the writer to learn what others have done along similar lines.

C. M. SCHWERIN.

Chicago, April 21, 1904.

---

ORES FROM IGNEOUS MAGMAS.

*The Editor:*

Sir.—When considering the question of sources of natural heat underground, the effect of chemical reaction in elevating temperatures should not be overlooked. Like myself, many miners doubtless have observed instances of localized heat, whose dependence upon the central heat of the planet is negatived by the existence of deeper and cooler portions of the same system of openings. The occurrence of sulphuric acid solution is associated with this manifestation.

F. W. CARNAHAN.

Charlotte, N. C., May 4, 1904.

---

RADIUM IN URANIUM COMPOUNDS.

*The Editor:*

Sir.—I am at present engaged in conducting an extensive investigation of uranium-bearing minerals, particularly with respect to the radio-active constituents which they contain, and, in the course of this work, I have determined one point which seems to be of sufficient importance to warrant immediate publication. This is the fact that the per cent of radium in a mineral appears to vary directly as the per cent of uranium present.

A brief description of the method which has been employed will not be without interest and is here given: A piece of apparatus constructed entirely of glass was first prepared. This consisted of a bulb ($A$) of about 50 cubic centimeters capacity, which was joined by a short tube to a smaller bulb ($B$), the latter being in turn connected with a still smaller bulb ($C$). An accurately weighed quantity of the very finely powdered mineral was introduced into the bulb $B$, and in the bulb $C$ was placed a sufficient quantity of a suitable acid, its actual quantity and nature depending on the character of the particular mineral under investigation. The whole apparatus was then sealed up air-tight at a slightly diminished pressure and, by tilting, the acid was transferred to the bulb $B$ containing the mineral. The mineral was then completely decomposed by gentle warming and the apparatus was allowed to stand for several days to permit the radium emanation, which is set free when the radium salts pass into solution, to diffuse uniformly through the interior of the apparatus. The bulb $A$ was then sealed off from the rest of the apparatus, allowed to stand for two hours, in order that any rapidly decaying emanations (actinium and thorium) which it contained might completely decompose, and, after washing the interior walls with a strong sodium hydroxide solution to completely remove acid fumes, the air and radium emanation which it contained was transferred to an air-tight electroscope, and the rate of leak measured. In comparing the results obtained with different minerals, the rate of leak at the end of three hours was chosen, since at this time the rate of decay of the excited activity and its rate of formation are about equal, and the readings of the electroscope are constant over considerable periods. The rate of leak of the charge of the electroscope is directly proportional to the quantity of emanation contained in the electroscope.

The actual quantity of uranium in the solution in bulb $B$ was determined by analysis, and the relative proportion of the emanation measured to the entire amount produced was calculated from the measurement of the capacities of the two final parts of the apparatus. Since it has been shown by Rutherford that the physical properties of the radium emanation are those of a gas, and that its chemical properties are like those of argon (namely, that it is without chemical affinity) this method of calculation is perfectly permissible. Rutherford has likewise pointed out that in any closed system containing a salt of radium from which no emanation can escape the quantity of emanation which will accumulate is directly proportional to the quantity of radium present, and that for purposes of measurement similar to those here described this quantity of emanation reaches a maximum in a period of less than forty days. Since it is a simple matter to test a given mineral to determine how closely it approaches to such a closed system, the question as to the possible escape of emanation from the mineral and the state of equilibrium existing in it can readily be determined.

| No. | Substance. | Per cent Uranium present.. | Uranium taken. Grams. | Leak. Divisions per min. | Ratio of leak to Uranium. |
|---|---|---|---|---|---|
| 1.— | Uraninite ..... | 82.5 | 0.1067 | 22.5 | 211 |
| 2.— | Gummite ..... | 66.1 | 0.0982 | 20.8 | 212 |
| 3.— | Uranophane .... | 46.6 | 0.0671 | 12.1 | 181 |
| 4.— | Samarskite ..... | 9.5 | 0.0292 | 6.4 | 218 |
| 5.— | Uraninite ..... | 83.9 | 0.1017 | 18.7 | 184 |

(Nos. 1—4 from Spruce Pine, N. C., No. 5 from Branchville, Conn.)

The slightly low value of the ratio in No. 3 can be explained by the fact that this mineral at ordinary temperatures gives off constantly a small proportion of its emanation and is therefore not in complete equilibrium. In No. 5 a small portion of the emanation was accidentally allowed to escape. An experiment conducted with carnotite, and not yet quite completed, gives every indication of showing a close agreement with the results given in the table.

These figures demonstrate almost conclusively that the amounts of radium present in equal quantities of any two minerals or ores stand in direct proportion to the per cent of uranium present in each of the ores, a matter of very considerable scientific and practical importance. It has been suggested by J. J. Thomson and by Rutherford as very probable that radium is formed by the breaking down of the uranium atom, and if such were the case, a final state of equilibrium and a definite proportion between the uranium and the radium present in minerals would be expected. It was this very point which lead Rutherford and Soddy (*Philosophical Magazine*, 5, 576) to suggest that a complete study of the natural minerals might serve to throw much light on the nature of radio-active change.

An interesting point which immediately suggests itself is the improbability of any radium ore being found which contains a greater proportion of radium than pitchblende, since this mineral contains the highest known per cent of uranium.

The sensitiveness of the method which has been employed in the experiments here mentioned is something quite extraordinary as compared with that of the most refined of other known methods of chemical analysis. I have found that by this method of measuring the emanation it is possible to compare the relative quantities of radium in two samples of pitchblende weighing 0.001 gram and 0.002 gram, respectively, with a fair degree of accuracy, and, if we assume that pitchblende contains 0.001 of one per cent of radium, a value which is probably rather too high than otherwise, it is evident that the comparison is between two quantities of radium, the greater of which is only 0.000000001 gram and the smaller of which is only half that quantity. I am planning in the near future to attempt to establish a standard by measuring the emanation from a known weight of pure radium salt, and by introducing some refinements into the method as now carried out, it will probably be possible to quantitatively estimate a quantity of radium equal to perhaps one-one hundredth of the quantity above mentioned, or about 0.000000000001 gram.

It is perhaps interesting to note that a preliminary experiment, in which the relative amounts of polonium present in two different uranium minerals were compared, shows that in all probability the proportion of this element present in any mineral varies directly with the per cent of uranium present.

It is planned to publish shortly a much more detailed account of the methods and results of this investigation.

BERTRAM B. BOLTWOOD.

New Haven, Conn., May 7, 1904.

---

THE DEPOSITION OF ORES FROM AN IGNEOUS MAGMA.

*The Editor:*

Sir.—I am sure your readers will be grateful to Prof. Kemp for the part he has taken in this discussion. As a teacher and writer on the subject, he cannot be expected to endorse and accept every novel theory which the irresponsible free lance may put forward. But in the evolution of science the free lance is one of the necessary factors of progress.

As Spencer says, a comprehensive knowledge of anything can only be acquired by knowing what it is not, as well as by knowing what it is. And it is very encouraging to know that you are sufficiently alive to the importance of heterodox ideas in the search of truth, to allow a free discussion. As geology and mineralogy are still in a very crude and embryonic state, and very far from being exact sciences, it is quite safe to say that long before the end of this century the orthodox opinions of the present day will be as unorthodox as those of a century ago.

At present the most learned professors are the least reliable in giving a correct idea of what is to be expected from a vein formation which is new to them. And the history of metalliferous mining in all the States west of the Rocky Mountains shows what a vast amount of capital has been squandered by the most learned professors and their pupils, from the use of orthodox but false theories respecting ore deposits, the differentiation of minerals from molten magmas, and the permanency of veins in particular formations; so much so that until very lately the most successful capitalists and mine owners preferred the reports of practical mining engineers to that of the most distinguished geologists. Such would not be the case if geology as a science had reached a fair degree of perfection. One of the greatest difficulties the geologist has to meet is the different conditions and degrees of metamor-

phism, and that is the case in the Seward Peninsula. But it is easily seen that the metamorphism is due to geyser, rather than molten injections. Now all geyser action is secondary, and may be produced by the action of water on hot lime-rocks, or by acids on pyritic deposits. And geysers may be hot or cold, as many cases can be cited where a hot and cold geyser exist in the same formation, and less than a hundred feet apart.

Prof. Kemp says that previous to secondary action there must be the primary or internal pheat from the earth's nucleus; and, as the primary must precede the secondary, he does not see the need for a secondary eruptive magma. The rate of increase of temperature from the surface downward being 1° per 60 ft., then, plus the temperature at the surface, the temperature of the lime-rock at 10,000 ft. would be only about 216° F., and the sea water at such a temperature would not produce chemical action; the only effect would be a cooling one. But I have shown that the superincumbent strata were 30,000 ft. thick, which at 1° per 60 ft. would give 550° F. And as the eruption took place in the Carboniferous period, there is every reason to believe that the surface temperature was over 150° F., and the rate of increase at least 1° per 20 ft.; then the temperature of the lime-rock would be 1650° F., and might be much greater, owing to the proximity to the molten mass beneath. Furthermore it is conceded by Brooks and Collier (the authorities on that region) that the sea had covered that peninsula before the uplift; so that I am not using imaginary data in proving my case. And with respect to the increase of temperature quoted by the Professor, that is not applicable in Yellowstone Park, Virginia City, or in volcanic districts. We also know that the greatest authorities are of the opinion that the many active volcanoes being close to the ocean are produced by the action of sea water on hot lime-rocks, and that the lava ejected comes from that source.

As a rule, all the great mountain ranges are produced by eruptives; and it is difficult for geology to explain the cause of these local eruptions, unless by chemical combination. Now, there can be no chemical combination of an explosive character in an incandescent molten nucleus, to cause them. And although some astronomers think they may be caused by the moon's attraction, yet Lord Kelvin by mathematical analysis of the earth's motion has proven the non-existence of tidal action in the molten nucleus; and in fact uses that very argument to prove the non-existence of a molten nucleus. And if the earth is solid to its core, how can the eruptions originate from that source?

Another fact which cannot be explained by the orthodox theory of igneous molten magmas, is that all these magmas contain crystallized minerals. It is well known that crystallization cannot take place without a definite amount of water of crystallization; and to believe that water for that purpose can exist in the necessary quantity in an incandescent mineral mass is beyond my credulity. So that the proof is overwhelmingly in favor of the theory that all eruptive magmas which contain mineral crystals are secondary and of an aqueous-igneous origin.

ROBERT STEVENSON.

New York, May 2, 1904.

(The discussion has now served its purpose and is closed. Incidentally, it may be pointed out that we do *not* know that active volcanoes are produced by the action of sea water on hot rocks; indeed, the contrary notion, that the ocean is fed by water exuded by the magmas of the interior of the earth, is advocated by authoritative investigators. The whole study of the origin of volcanic activity is yet in its infancy.—EDITOR.)

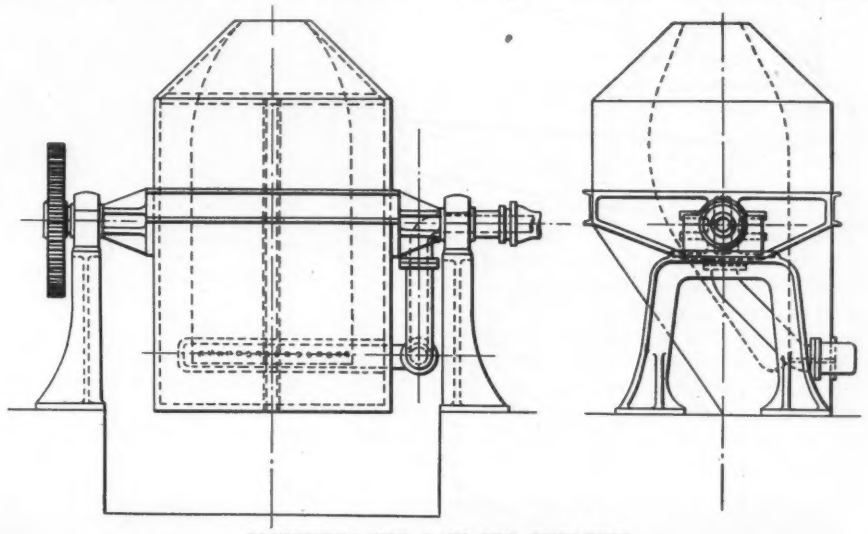
---

### PYRITE SMELTING IN NORWAY.

*The Editor*:

Sir.—In connection with the discussion on the smelting of pyritic ores, the following description of my method of raw ore smelting at Sulitelma, in Norway, will be of interest.

The process is a discontinuous smelting, in a specially constructed converter, such as is shown in the accompanying sketch. The main point is that the tuyeres are situated only a few centimeters above the bottom, and that the walls near the bottom of the furnace are very narrow. The converter is lined with magnesite. Common fire-clay becomes slagged off in a few charges.



CONVERTER FOR RAW ORE SMELTING.

The converter is started with a fresh charge, while it is still red hot (or yellow) from the previous operation. The converter is filled up with coke to just a little above the tuyeres—about 40 kg. of coke—and as soon as the coke is burning, the furnace is filled with the ore (and slag)—about 7.5 tons, that is, only 6 kg. of coke per ton of ore. The air is put on with a pressure of about 5 lb., slowly increasing to 10 or 15 lb. Very powerful action takes place at once, and after about ten minutes smelted ore is to be seen before the tuyeres. When the smelted ore covers the tuyeres, the pressure is increased to about 20 lb., and the whole mass of the charge is run down. The sulphides fuse first and the slag-making rock is commonly not wholly smelted, before about 1.5 hours after the starting. The yield of copper in the smelted mass is then about the same as in the raw ore; but from this point starts the concentration of the copper. A 6 per cent ore will commonly need 1.5 hours to give a 40 per cent matte, and about two hours to give a 60 to 70 per cent matte.

The whole smelting takes between three and four hours. The tapping and some little cleaning of the converter take about 45 minutes, so that the whole charge requires from 4 to 4.5 hours.

The ores smelted at Sulitelma contain 6 to 8 per cent copper, 32 to 34 per cent sulphur, 34 to 36 per cent iron, 2 to 4.5 per cent alumina, besides traces of lime and magnesia. This mode of smelting has now been tried on many other sulphide ores and the range of the chemical constitution of suitable ore is very wide. The new process is especially suited for nickel-bearing ore (pyrrhotite). The process is not only suited for coarse ore, but also for a mixture of coarse ore, sand and slime.

The loss in the slag is mostly mechanical; the chemical loss is 0.2 to 0.3 per cent copper. The whole loss for the present is 0.6 to 0.9 per cent copper, which is much less than by ordinary calcining and smelting in a cupola, where the total loss on our ore is about 1.1 per cent; with nickel ores 73.7 per cent of the total nickel content was recovered.

Where fuel is cheap, all the slag can be tapped into a reverberatory furnace and allowed to settle a few hours, and the whole loss in the slag will be only 0.25 to 0.30 per cent copper.

The cost per ton of smelted ore will depend on local circumstances. A converter with a charge of 7.5 tons wants about 160 h.p. on the air-compressor. The necessary laborers are four men at the converter itself, one for charging, one for slag and matte transport, one foreman. The total costs per 24 hours, for 40 tons of ore smelted, are, under Norwegian conditions:

| | | |
|---|---|---|
| Wages | Kr. 53.60 | or $14.47 |
| Power | 21.00 | 5.67 |
| Coke, 240 kilos at 35 kr. per ton | 8.40 | 2.27 |
| Magnesite brick | 40.00 | 10.80 |
| Amortization and interest | 20.00 | 5.40 |
| Supervision | 0.25 | 0.07 |
| | Kr. 143.25 | $38.68 |

Or Kr. 3.58 ($0.97) per ton. To this must be added the royalty for the patent.

In the smelting plant at Sulitelma the old water-jacket cupolas have been dispensed with, and only smelting of raw un-roasted ore is now practiced.

E. KNUDSEN.

Birtavarre Mines, Norway, March 11, 1904.

---

**METAL MINING IN INDO-CHINA.**—A recent official report on the mines of the French colony of Indo-China says that iron ore is mined at Thainguyen, manganese ore at Phu-lien, and antimony ore at Quangyen. Concessions for metal mining, recently granted, include 20 for gold, chiefly in the province of Hoabinh, four for copper at Vanbu, Thainguyen and Yenbay; two for iron ore in Quangyen, and seven for other minerals. Nickel ore is reported to exist in the province of Tuyenquang.

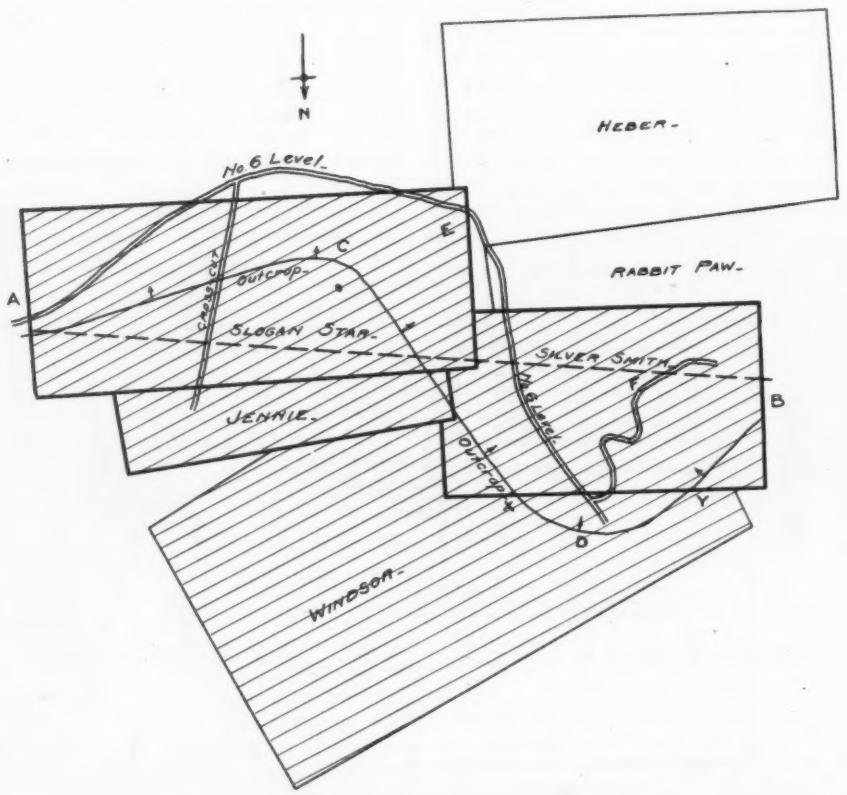
## MINING LITIGATION IN BRITISH COLUMBIA.

BY AN OCCASIONAL CORRESPONDENT.

Up to April 23, 1892, the mining laws of British Columbia were nearly identical with those of the United States and the title to mining claims included the 'extra-lateral rights.' A radical change was then made in the law, and claims located since carry title only to the ground enclosed within the boundary lines and the vertical planes thereof, extended. It was not possible to withdraw the extra-lateral rights from the claims already located, but, fortunately, mining was not sufficiently widespread at that time to bring about any such wholesale litigation as that which has characterized so many camps in the United States.

The first case in British Columbia, involving extra-lateral rights, namely, the Centre Star versus Iron Mask, was tried at Rossland several years ago and resulted in a compromise early in the trial. The second case has only recently been brought to trial and has presented some new and interesting points; this is the suit of the Star Mining & Milling Company versus the Byron N. White Mining Company, in which the former sued for $500,000 damages for trespass and ore extracted. The defendant acknowledged having mined within the boundary line of plaintiff's ground, but claims justification under the law providing for extra-lateral rights.

The defendant is operating one of the largest and richest silver-lead mines in the Slocan country, and the title to the continuation of his principal ore-bodies is involved in this suit. The mining claims over which the litigation extends are held partly under the old and partly under the new laws, as shown in the accompanying plan. The claims drawn in thick lines were located under the old law and carry extra-lateral rights; the others were located under the new law and do not carry extra-lateral rights. The claims shaded are the property of the defendant company, the others belonging to the plaintiff. The defendant set up the plea of justification on the contention that he had a continuous vein whose outcrop extends through his property along the curved line *A B*, these two points being on the end lines of two of his claims and that the 'general course' of the vein, or, as it was termed, 'legal apex,' is along the dotted, straight line *A B*; establishing his apex on these grounds, he claims extra-lateral rights within his end lines at *A* and *B*.




The first new point attracting attention is whether the 'general course' of a vein can be extended across more than one claim in order to establish the 'legal apex,' and more particularly so when it is admitted that the outcrop passes out through the side-line of one claim and across a second one at an angle less than 45° to the center line thereof, the British Columbia law providing especially that in the latter case the side-lines become the end-lines of such claim.

The second novel point is in regard to the section *x y*. The outcrop here extends into a claim, which, while the property of the defendants, carries no extra-lateral rights. That part of the vein within the Windsor boundary line vertically extended, is indisputably included in the title of that claim, and while the vein persists downward into the Silver Smith claim, the actual outcrop is not within the latter's boundary lines. There is naturally no precedent for such a state of affairs in United States practice and the unravelling of this legal skein is fortunately in the hands of very able men.

In the neighborhood of *E* there exists a fine body of ore at the No. 6 level, the only one shown on the plan. This is the immediate cause of the suit and the trespass claimed was made at this point. Around point *F* another fine body of ore occurs, dipping at a flat angle toward the Rabbit Paw ground. If this latter body should continue across the boundary line of that claim its rightful ownership will have to be decided in the courts.

The Star Company, in disputing the plea of justification, contended that the outcrop of the vein as described by the defendant company was not continuous, but that from *C* the portion *C D* was on a fault-fissure of different age to the productive part of the vein, *A C* and *D. B.* This contention was so well maintained that the judge adjourned the case pending the carrying out of certain work to be done, under the direction of the Court, with the object of proving or disproving the existence of a fault. Upon conclusion of this work, which is to be done under the supervision of Mr. S. F. Parrish, manager of the Le Roi mine at Rossland, the legal argument will be taken up. The case was heard during February before His Lordship Chief Justice Gordon Hunter, in the Supreme Court, at Nelson, B. C., and the taking of evidence occupied 17 days.

## A CORRECTION—ROCK DRILL BITS.

In the article on 'Rock Drill Bits,' by Mr. T. H. Proske, published on page 724 of our issue for May 5, some of the engravings were transposed, through an unfortunate mistake in making up. Figs. 1, 2, 3, 4 and 5, as printed, should have been Figs. 6, 7, 8, 9 and 10, respectively. In order to make the matter clear, and to enable readers to refer again to the descriptions given in the article, we reprint the drawings herewith; this time with the correct figure numbers attached. We regret the mistake, but take the most direct means of repairing it.

FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5.

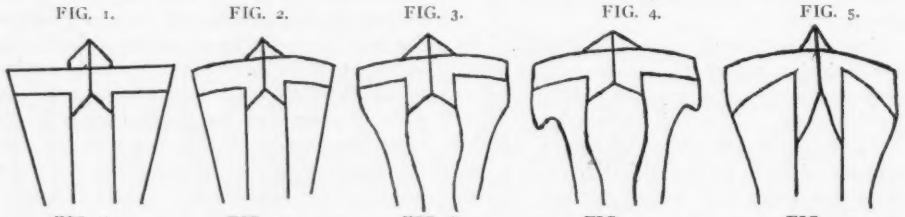
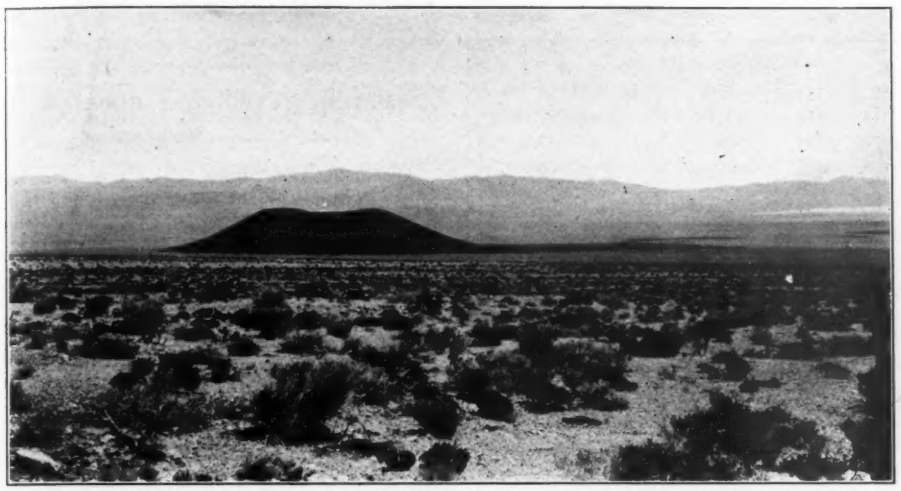


FIG. 6. FIG. 7. FIG. 8. FIG. 9. FIG. 10.

## THE SILVER PEAK REGION, NEVADA.*

By J. E. SPURR.

This is an arid district, situated in southwestern Nevada, adjacent to the California boundary. There are at present only a few hundred people there. Although there is no great amount of actual mining going on, some prospecting is being done. The region is well mineralized; it is constantly attracting outside attention, and it is likely to become the seat of a profitable mining industry, with improvement in the conditions and cost of production.



RECENT VOLCANIC CRATER—BASALT—NEAR SILVER PEAK.

An examination of the region by Mr. H. W. Turner for the Geological Survey, shows that the chief rocks are Paleozoic limestones, granitic rocks of pre-Tertiary age (granites, diorites, etc.), with abundant Tertiary sediments and Tertiary lavas (rhyolites, andesites and basalts). As is usual in the desert country, the Pleistocene wash from the mountains floors the valleys and fringes the mountains, forming a conspicuous geological feature.

Ore deposits are known to exist in several different parts of the Silver Peak region. The chief districts are the Silver Peak district proper, occupying the mountain spur known as Mineral Ridge, west of the camp of Silver Peak; the Lone Mountain district, northwest of Silver Peak; the Windypah or Fesler district in the southern part of the Silver Peak range; and what may be called the Palmetto district, on the northern slope of the mountains of that name.

All of these districts, and indeed all the ore deposits known, occur in general connection with large intrusive bodies of pre-Tertiary granitic rock. The ore-bodies sometimes occur within the granitic rock, but more usually in the Paleozoic (Cambrian and Silurian) limestones into which it is intrusive, within a broad belt following the intrusive contact; they do not occur in the Tertiary rocks.

The Silver Peak district, which is the oldest and the most important, contains abandoned silver mines, and some gold mines which are regarded as promising. The silver prospects were discovered in 1864, and were worked in a desultory way until 1869.

The principal properties thus far developed, both silver and gold, belong to D. C. Blair, of New York. A 30-stamp mill, for working the gold ores of the Blair mines, was finished at Silver Peak in 1861, and was worked for two years. The mines were then idle till the early eighties, when they were leased for two or three years. Another long period of idleness ensued, and in 1893 a lease was again given for one year. Immediately after this, the mine became involved in litigation, which has only very recently been settled. Mining and milling in a small and intermittent way, meanwhile, have been conducted on a number of the veins, generally of minor importance, outside of the Blair properties.

Is is estimated by persons who have been familiar with the history of the locality that the silver mines produced a gross value of $200,000, most of which came from the Pocatello and the Vanderbilt, while the Blair gold mines are estimated to have produced $1,280,000. From the important Mary mine, situated near the Blair gold properties, Mr. John Chiatovich, the owner, has taken out and milled $46,000, and from other mines some $7,000 or $8,000. The Valcalde brothers have also taken out and milled ore yielding several thousand dollars.

DRINKWATER TUNNEL, BLAIR MINE.

The Drinkwater group of mines, constituting the most important part of the Blair gold properties, may be taken as a type of the gold veins, which, though widespread and numerous, show a wonderful similarity of character. On the surface apparently two adjacent veins outcrop, the Crowning Glory and the Drinkwater, the former the wider, the latter containing the larger quantity of good ore. The quality of the ore still left standing (only the richer portions having been removed for milling) has been determined a number of times. An exhaustive and careful sampling by Mr. George W. Maynard, of New York, gives the average assay-value of the measurable reserves of the underlying Crowning Glory Vein at $5 for a tonnage of 107,370, and a total value of $537,550. For the Drinkwater vein the average value was $9.18 for a tonnage of 4,558, and a total value of $42,118, making $579,668 for both mines. Mr. Maynard estimated the probable reserves at nearly as much, making a total of approximately a million dollars. Since Mr. Maynard's examination, several years ago, a considerable amount of new development work has been done.

Geologically, the veins of the Blair mines are interesting. They are flattened lenses of quartz occurring in a definite zone. The lenses wedge out and disappear, and their place is taken by overlapping lenses. The wall-rock is a schist, mainly derived from the metamorphism of an original lime shale. Frequently, also, the wall-rock is a very silicious granitic rock made up essentially of quartz and feldspar (alaskite). This alaskite occurs in the schist in lenses similar to the quartz. There is, moreover, every transition between the alaskite and the quartz, and the schist has been, so to speak, saturated with this silicious material, which forms seams and tiny lenses in it. The gold-bearing quartz lenses run laterally into quartz-feldspar rock by the coming in of quartz. As a rule the values grow insignificant with the development of feldspar, but occasionally high values may be found in this lateral rock.

The general conclusion is that a series of shales and limestones has been invaded by a very silicious granitic intrusion which has metamorphosed the sediments to schists and

*Published by permission of the Director of the United States Geological Survey.

has formed lenses throughout the formation. The quartz has probably the same origin and nature as the alaskite, both being silicious phases of a granitic magma. The gold in the quartz is usually free, sometimes associated with scattered galena. Greenstone or altered diorite dikes cut the veins or follow them, being of later age. Along the dikes there has been some water circulation, resulting sometimes in impoverishment, sometimes in relative concentration of the original values. This zone of veins outcrops for a mile along the mountain side. At one point, some distance below the vein zone, free gold was found in the alaskite-pegmatite country rock. In the main the other gold mines or prospects of the region have exactly the same geology.

The ore deposits of the Lone Mountain district are situated near two masses of intrusive granitic rock, one of which makes up Lone Mountain proper, while the other lies in the lower mountains to the south. The properties visited by me include the Paymaster, the Esperanaza, the Utopia, the Alpine. the Weepah district, and numerous prospects. The first three mines mentioned all belong to the same class, being small, non-persisent veins in Cambrian limestone and slate. These veins are generally parallel to the stratification. They follow crushed zones or selvages formed by movement in the limestone, possibly attendant upon faulting. The ore consists of small amounts of rich silver sulphides, with some galena, pyrite, and secondary minerals, such as chrysocolla, limonite, probably chlorobromides of silver, etc. The Alpine mine is situated near the contact with the Lone Mountain granite, in a series of metamorphic marbles with some interbedded schists. In the marbles are seams of ore parallel to the stratification. Small quartz seams contain galena and are low-grade silver ores. These lead into bodies of mixed galena and argentiferous lead carbonate, which widen out into irregular pockets and constitute the ore which is mined. The ore-bodies follow a certain horizon around the hill with lesser seams above and below. Diorite sheets and cross-cutting dikes are frequent, but they are not in any way associated with the ore.

The area of intrusive granite above noted as lying south of the Lone Mountain granite is marked by contact metamorphism in the limestone and shale into which it is intrusive. On its eastern side there was noted, interstratified with schistose slates and crystalline limestones, a metamorphosed belt, 60 ft. wide and traceable for a long distance. This zone is characterized by epidote, garnet, chalcopyrite, calcite, magnetite, specular iron, pyrite and galena, with certain secondary minerals, such as chrysocolla and limonite. Some of the material gives fair assays for silver, and some shows gold. In some tin, also, has been claimed, but analysis made by the Survey does not show any of this metal.

The Windypah. or Fesler, district lies in the southern part of the Silver Peak range, east of Piper's ranch. There is an abandoned prospect, the Good Hope, several miles northeast of the district, in the same geological position, but the camp mentioned was discovered in 1903. Considerable prospecting has been done. There is a large body of granitic rock, intrusive into Silurian limestones, and the ores occur in both formations. The veins may be divided into three distinct classes:

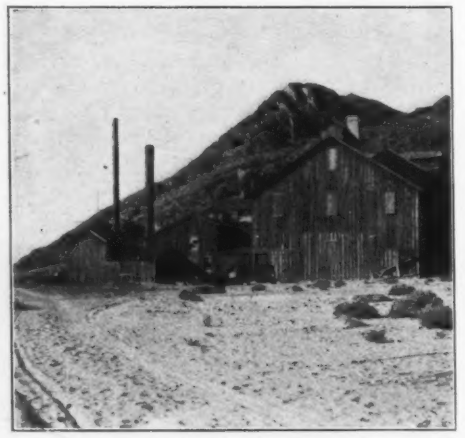
1. Segregations in alaskite, which is locally intrusive into the granitic rock. These sometimes show good gold values in segregated bunches of quartz and in the adjacent silicious alaskite. The quartz lenses are limited in size and have not been proved to have any regular connection.

2. Quartz veins in granite. These have formed along crushed or sheared zones. The amount of quartz is variable and the walls are ill-defined. In mineralogical character they are like the first class of deposits. The gold values are locally good, but all workings up to the present have been near the surface.

3. Veins near the contact of granite and

PAYMASTER MINE, LONE MOUNTAIN.

limestone; noble silver quartz veins carrying a rich black copper-silver mineral, which is also gold-bearing. These veins are very persistent, following the contact for miles, though different parts may not always be perfectly connected. Where noted, they follow the contact of silicious dikes, alaskite in part, which are probably border phases of the granitic inclusions. They do not have well-defined walls and probably are to be regarded as replacement of the limestone along the dike contacts.



OLD MILL, SILVER PEAK.

Frequently a dike has such a vein on both sides, more or less intermittent.

All the ore deposits of the Silver Peak region are connected with intrusive granitic rock and lie either within this granite or, more often, in the Paleozoic limestone into which this is intrusive. The age of all the deposits is pre-Tertiary. The ores have probably been formed in part directly as an ultra-silicious segregation from the granite; in part by the effect of solutions from the granite in the adjacent limestones.

The most important district, the gold district of Silver Peak, belongs to the first class, and others mainly to the second class. All these other districts, except Windypah, as before stated, were partly prospected and abandoned years ago, and owe their recent activity directly to interest produced by the discovery of Tonopah. Many of the veins in them are not highly encouraging. On the other hand, some of the mines in the Lone Mountain district have recently produced considerable ore—for example, the Alpine has shipped over $70,000 worth within the last calendar year. Some of the prospects within the Windypah district appear worthy of investigation. The Silver Peak district proper is a vast treasury of low-grade gold ores.

## MINING METHODS AT BINGHAM.

BY AN OCCASIONAL CORRESPONDENT.

The application of the caving system to the mines of Bingham, in Utah, differs little from the practice of the Lake Superior district. The ore-bodies occur in a limestone, which is fractured and very much broken by fissures occurring at right angles to the bedding of the formation. The fissures and cracks are filled with talc, making it practically impossible to hold the hanging wall with timber, especially as the bodies vary in width from 10 to 50 ft., and lie at an angle of about 40° from the horizontal. Main levels are driven 100 ft. apart; raises are put up from these levels to the top of the ore at convenient distances apart; then sub-levels are driven 14 ft. apart. Extraction begins at the top sub-level, but while this is being done, the lower levels are being cut into blocks about 15 to 20 ft. square by small drifts, which are sometimes timbered where occasion requires it, or where the ore is soft or broken. The timber used is round, and from 6 to 8 in. in diameter.

Owing to the ore-bodies being so flat, there is not the advantage of the caved ground following the extraction down and crushing the ore with its weight as it is cut into blocks, as is the case in the Lake Superior district, and at each level there is a certain portion of the ore-body lying next to the hanging wall that does not have any caved ground immediately over it. The hanging wall will not cave until from 20 to 30 ft. of it is exposed. It becomes necessary, therefore, to use props or stulls to support the hanging wall until the ore is taken away, and sufficient area exposed, so that the hanging-wall will cave of its own weight.

The timber used for this purpose is simply round poles, varying from 6 to 10 in. in diameter, and it is rarely that timbers longer than 6 to 8 ft. are required. Where the vein is narrow, stulls are used to reach from foot-wall to hanging-wall, but these are only placed in sufficient number to hold the hanging temporarily, until the ore is extracted, and if the hanging does not cave as soon as the ore is cut, the stulls are blasted, so as to allow the hanging wall to cave, to prevent any large openings being left overhead.

It is a matter of experience that the caving system works at its best when the ore-bodies occur at an angle of 55° to 90° from the horizontal. When such conditions exist, the timber and caved ground follow down in a body as the ore is extracted, the timbers forming a network which is convenient to work under, the caved ground making sufficient weight to crush the ore as it is cut into blocks by the small drifts, thus avoiding the use of powder and lessening the cost of mining by a corresponding amount.

## SECRET RESERVES.

BY F. H. BATHURST.

The question of the hour in Victoria, Australia, is the right of a mine manager to keep a secret reserve of gold for the purpose of averaging yields. Attention has been directed to the subject through the discovery by one of the directors of a deep-lead alluvial mine that the manager kept a reserve which he used for averaging purposes. The auditors, on seeing the fact announced in the Melbourne *Argus* that such a reserve existed, called on the mine manager to produce his 'gold-books.' The manager thereupon forwarded to them two books, No. 1 showing the gold sent by him to the bank, which corresponded with the yields as reported to the directors and the shareholders week by week; No. 2 varied from No. 1, inasmuch as this book purported to show the whole of the gold taken from the sluice-boxes day by day, and therefore it accounted for the reserve also. This reserve the manager had made up by taking gold from the daily yields when high, and storing it in his safe. It went there without the knowledge of the board, who also were not made acquainted with any withdrawals from it. The only check was, as is the case with all Victorian deep-lead mines, the sluice-man. This is the man who cleans up the sluice, and he, with the manager, weighs the gold and initials the entry of the amount in the manager's gold-book, but he does not report to the directors. The sluice-man is appointed by the directors, and therefore he is supposed to be independent of the manager. It may be added that the occasion of the auditors calling upon the mine manager for his gold-book was that the gold in reserve was not shown in the half-yearly accounts just as it had never been shown in the weekly yields.

By the Victorian Companies' Act directors have to publish a full statement of assets and liabilities each half-year, and in addition the shareholders and the creditors have the right to demand and must be supplied with, on payment of a small fee, three months' accounts of a mining company. It is easy to see that the first of these obligations—that of presenting a true statement of assets and liabilities—cannot be fulfilled if a vital portion of the assets is kept secret at the mine. In the same way it is evident that if a shareholder, in the exercise of his statutory right, demanded a complete statement of accounts, he would not get it if the directors and legal manager did not include this gold reserve. The object of the legislature in allowing this privilege to creditors and shareholders was to prevent secrecy, so that the mining investor might be on the same footing as the director or any other officials of the company. Parliament held to the opinion that it was necessary for the well-being of the industry that its affairs should be open and above board as far as was possible, and very few directors have had the temerity to offer opposition to its determination in that respect.

Now it is the practice with certain directors, after they have appointed the manager, to make no inquiry whether he has a gold reserve. "We have confidence in our mine manager and we trust him to work the mine to the best advantage," they say. "If he thinks it is desirable to keep a gold reserve to equalize yields, let him do so. We do not want to know, and if we do not know we do not tell a lie when we say to shareholders that we are not aware if a reserve is kept." It is clear this view involves a shirking of responsibility. In Australia, whatever he may be elsewhere, the director is a trustee. The whole spirit of legislation is that he must fulfill his trust or be responsible for his dereliction of duty. Indeed, in one case it was decided that a director was compelled to make up the loss in value of shares, where he had told a shareholder who had asked his advice on the subject to hold on to his scrip. Therefore, as directors are entrusted with the control of a mine, they have no right to let their mine manager regulate the yields unless they are fully cognizant of the fact. In this connection it must be explained that the practice in Victoria is to publish yields weekly, and the market ebbs and flows as the returns vary. Hence an additional reason is afforded certain directors for not inquiring about the gold reserve, because they do not wish to be open to the charge of having secret information that would advantage them in stock and share dealing as against the ordinary shareholder. It will be seen that in this question of the gold reserve, two factors operate with mining directors; first, that of trust reposed in the mine manager and, second, that of keeping the market steady by presenting average yields.

When a short time ago Mr. Herbert J. Daly, writing in London on the subject of the gutting of the bonanza ore in the Lake View Consols, justified the action of the management in that matter, he came in for criticism in Australia. The argument used in antagonism to his was that the rushing out of rich ore should not be done, unless the mine is well developed ahead, and the company is financially so strong that it can see its way to mine in that fashion so as to give shareholders a return in the quickest possible time. Concurrently also, it is claimed that notification ought to be made to the shareholders that they must not expect their yields to keep up at a bonanza rate. Now, if the opposite policy of keeping a bank in the mine is pursued, then there will be just the same scope for manipulating yields by averaging them, as there is when a manager keeps a secret reserve at the surface. Yet, in that case, the directors can be kept in ignorance unless constant sampling is done and assay-plans are regularly furnished to them to show how the stopes are advancing and how the rich ore is being encroached upon or left alone. But the law would not, as it stands, reach a mine manager who did this, and it could not touch directors who might not know anything of the true position of affairs. Of course, in Victorian quartz mines, where it would be almost fatal to a company from a share market point of view to refuse to allow a weekly or fortnightly inspection of the property to shareholders or their experts, it would not be possible long to conceal any depletion of the rich reserves, or for the matter of that, any hoarding of it up. In West Australia, however, there are mines which are not open to inspection, and where the directors put themselves absolutely in the hands of the mine managers. In such cases it is evident that, if the frankness commanded by the law in Victoria in respect to reports and accounts is not practised, great fraud is possible. Yields can, if a manager is dishonest, be manipulated so that if shares are wanted to be bought returns can be made low, and kept low until scrip is bought in small lots, when the return can be gradually increased; the result being a sharp advance in market values. Then, if a bank is in existence, but the average ore is losing its richness, shares can be sold short and yields maintained until the crash is wanted. Thus it is a case of "Heads I win, tails you lose."

The same position exists exactly with alluvial mines, where a secret reserve is kept. The company is in the hands of the men who know of it. An opening for fraud exists, and it is undoubted that more than one mine manager has succumbed to the temptation put in his way, to co-operate on the stock exchange with brokers who knew how to turn to account the secret information furnished them. Thus it will be seen that wherever reserves of any kind exist at mines the personal equation must rule first with the mine manager, and, if he is honest, next with the directors to whom he reports the true position of affairs. The feeling in Victoria to-day is that there ought to be no personal equation. What investors want is that they shall know the worst or the best of mining and at once. If the ground is rich, it ought to be fairly mined and the fact reported that the yield is high because of the exceptional quality of the ore or the gravel. Or if the ground becomes poor, they do not want the manager to have his eye on the share list to try to keep quotations at a fictitious price, by averaging yields at a figure which the condition of the mine does not justify. They want the directors to establish cash reserves (which will appear in the balance sheet) when times are good and to equalize dividends from that reserve, or to use it to keep the mine going. And above all, they ask that the truth shall be told at all times, in respect to the position of the mine and as to the actual returns obtained. There can be no doubt as to the trend of public sentiment in this matter, for it has been gravely proposed by the Chamber of Mines of Victoria that mine managers shall be compelled to accompany all their reports with a declaration that the contents are true. Indeed it is likely that the outcome of the recent discussion on secret reserves will be that in the Amending Companies Bill a provision to that effect will be sought to be placed on the statute book. Then, if managers do not tell the truth, they will be liable to a criminal prosecution for perjury, and directors who hold back facts which might influence the course of the share market will run the risk of becoming subject to actions for breach of trust.

---

RADIUM IN MINERAL WATERS.—As bearing on the distribution of radium in nature, some results obtained by R. J. Strutt and given by him in a paper read before the Royal Society, March 10, 1904, are of interest. Mr. Strutt found that deposits from two hot springs at Bath and one at Buxton, England, showed radio-activity. The rate of decay of emanation from the deposits was found to be identical with that of the emanation from radium, and there is every reason to believe in the presence of radium. The quantity present of this element is, however, very small, the total amount contained in the water discharged by the Bath spring during a year being estimated at one-third of a gram. The spring gives off about 100 cu. ft. of gas per day, about 0.1 per cent of which is helium, so that about 1,000 liters of helium are given off annually. The proportion of helium to radium, though somewhat larger than in the radio-active minerals, is in accordance with the view that the spring draws its supply from the disintegration of such minerals.

## DREDGING FOR PLATINUM IN THE URAL MOUNTAINS.

By CHESTER W. PURINGTON.

(*Continued from page 722.*)

Assays of the dunite show the presence of platinum and gold up to the amount of 0.037

DREDGE ON THE TURA RIVER.

oz. per ton (47 *doli* to the 100 *poods*). Exhaustive tests have not been made, but they lead to the inference that the platinum is present in the dunite, and that it must contain an enormous amount; and they bring up the question of the possibility of the exploitation of deep platinum mines. There is no doubt that in the midst of the dunite masses there exist some richer areas, favorable alike on account of primary or magmatic, and secondary processes, which might be worked advantageously at the present time. Detailed prospecting is the only way to prove up such areas, within the areas which the geological survey has defined. Such exploration must come about in time when the platinum sands shall have become exhausted, and the price of platinum increases.

The investigations already pursued give precise data as to the geological probabilities of the occurrence of platinum in this and other parts of the Ural. It is to be noted that all the localities favorable to the occurrence of platinum are characterized by the presence of the indicated varieties of dunite. Occurrences of this rock are found for a great length north and south, along the narrow Ural ridge, where the deep-seated rocks are laid bare.

To the north of the Iss valley a strip of

TURA RIVER, ABOVE JERUSALEM PLACER.

dunite continues uninterruptedly. Platinum makes its appearance wherever dunite is exposed. In the area adjacent to the boundary of the Nikolai Pavdinsk and Shuvalov grants, on the Bolshoi and Mali Kamenushka creeks, platinum placers are worked and the annual product amounts to 3,160 ounces.

Farther north the dunite is exposed to view in two outcrops on Kosvinski hill, near the boundary of the Rastessk and Nikolai Pavdinsk grants. In this locality the yearly platinum product from the Sosnovka and Mali Kosva creeks is 5,790 ounces.

Fifty miles farther north olivine-bearing rocks outcrop on the west boundary of the Bogoslovsk district in the area adjacent to Knivinski peak, and Kumba and Gold hills. Platinum, as an accompaniment of the gold in the placers, is principally obtained at Bogoslovsk from the left branch of Vagran river. The Bogoslovsk yearly platinum product is from 250 to 500 ounces.

Along this north central part of the Ural to the north of the Iss valley there are several minor platinum producing regions in the foothill country of the east slope. These are the Vagransk, Znamensk and Nijni Turinsk districts, on the rivers Lobva, Lyalya, and Nyasma. Platinum is also found accompanying gold along the Aktai, Emech and Tagil rivers.

Still farther north in the Nijni Zaozervsk

JERUSALEM PLACER.

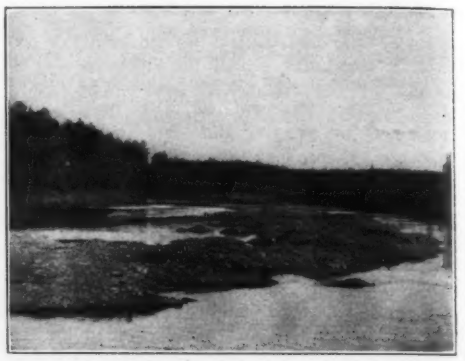
district dunite appears as dikes cutting the Denezhkine hill, on the west slope of which platiniferous gravels are worked. These workings together with those of the little Solva and the Ivdel rivers make up a yearly product of 800 ounces.

One hundred miles to the north of the Iss valley outcrops of olivine-bearing rocks are seen on Chistop and Choi-Ekba mountains, and platinum is found in the creeks heading in these mountains; namely Tosem, Long-Sos, flowing into the Ushma, and the Petropavlovsk, flowing into the Lozva. The product of this last region is only 55 oz. a year.

To the south of the Iss valley, along the Ural chain, the outcrops of plutonic rocks become much narrower, and until the Nijni Tagil district, 80 miles to the south, is reached, no more outcrops of olivine rocks are seen. The annual platinum product, from certain rivers of the east slope, namely the Immyana, Tura, and the Chirok, a branch of the Solda, is, however, about 1,000 ounces.

Farther south the igneous rocks again widen, and olivine-bearing rocks appear on Blue mountain on the edge of the Baranchinsk district, on Orulich, Dry gulch, Black creek and Swift creek. From these creeks platinum is annually obtained to the amount of from 750 to 1,500 ounces.

In the Nijni Tagil district outcrops of olivine rocks extend for long distances lengthwise of the divide, on Sparrow, Nightingale and Shulpik mountains. All the creeks head-



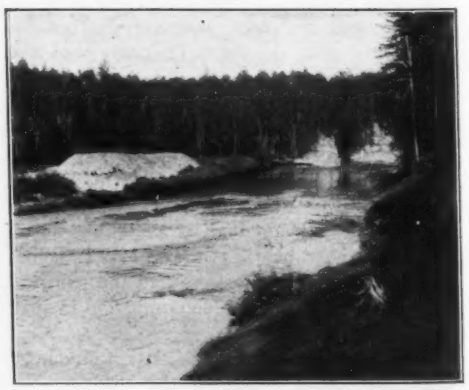
TAILINGS FROM DREDGING.

ing in these are platiniferous, as, for example, the Sisim, Visim, Chaoosh, Martian, and Black creeks. The annual product is from 37,000 to 51,000 ounces.

To the south from Nijni Tagil the continuity of the strip of igneous rocks is broken, and the platinum areas which are commercially valuable become few and scattered. Nevertheless, even to the southern extremity of the Ural there are more or less isolated outcrops of olivine-bearing rocks with accompanying platinum. Examples are the Kishtim district, Isetsk, and Miask districts, all situated from 150 to 250 miles south of the Iss. It is remarkable that with the insignificant platinum product of the last districts mentioned is mingled a much larger proportion of the other metals of the platinum group. The principal of these is osmium-iridium. The product of this, coming principally from Neviansk, Verk Isetsk, Alapavsk, Bilimba, Sisertsk, Kishtim, and Miask is 395 oz. Miask produces annually 263 oz. Miask is a station on the Trans-Siberian railroad.[18]

Still farther south, on the Balbuk gold placers, near Warsaw station, and in the Urtaz, Tamalik, and Sakmar creeks at Orsk, platinum is obtained in insignificant quantity.

In the central and southern Ural, since the



TAILINGS FROM WING-DAM.

ground is well prospected, new discoveries of platinum gravels are not to be expected. But in the northern Ural, within the region covered

[18]One of the operators of the Tura informed the writer in 1902 that the platinum dust marketed by him contained 84% platinum, 3% osmium-iridium, 2% gold and 11% impurities.

by the favorable gangue rock, detailed investigations should open up undiscovered areas of platiniferous dunite. In this connection it should be borne in mind that the northern Ural for the length of nearly three hundred miles remains to this time unknown. In this region, on the east slope of the mountains, the plutonic rocks, including the platinum-bearing dunite extend to the Arctic Circle. Until this great region is explored it cannot be said that the reserves of platinum in the Ural are in danger of being exhausted.

The same journal from which the above is translated gives some notes concerning the progress of dredge construction in the Ural which are here appended. Quotations are also

MINING PLATINUM BY THE "PACHAR," TURA RIVER.

given from an editorial in the 'Bulletin' on the activity which is now being evinced in this branch of gold mining. At the outset it may be said that the platinum fields lying along the lower Iss and the Tura rivers appear to present an attractive field for the installation of dredges, and are at least worthy of exploration with a view to the installation of such machinery.

In the 'Bulletin of the Gold Mining Industry,' No. 1, Jan. 1, 1904, the following item occurs:

"In the present year five dredges are under construction and in part completed by the Putilof works for the following parties:

1. The Tura Platinum Mining Company (formerly Shpenneman & Imshenetsky) for the Jerusalem placer. The dredge will be provided with two Siberian pans (*chashas*), and will have a capacity of 1,270 cubic yards (100 cubic *sajenes*) in 24 hours.

2. The Emperor's Cabinet operations on the Verkni Taila placer in the Altai: dredge with three trommels, capacity not stated.

3. Messrs. Mashukof & Yakovlev, for the Pochetno-Grazhdanine placer in the South Yenesei region of Siberia: dredge with a shaking grizzly.

4. Mr. Sharipov, for the Benjamin placer in the South Yenessei region: a dredge of the same description.

5. The brothers Yakovlev, for the Nikolai placer: a dredge with two trommels.

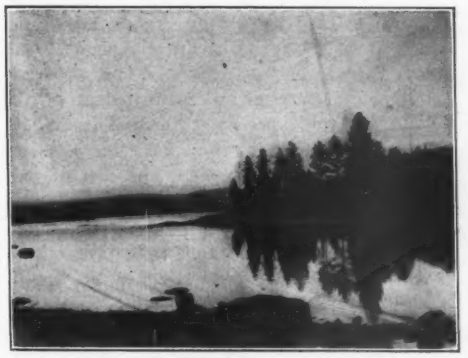
Beside these it is understood that a dredge has been ordered from Putilov for the Ivdel river in the northern Ural in the Moscow grant of the Polyakov Timber Company. This river Ivdel, although in a locality fairly inaccessible, has long been known for its gold gravels, and for the past 15 years the gravels have been worked by peasants with *pachari* (boat-shovels). At many points in the northern Ural the work of installing dredges is proceeding at a rapid pace.

Thus on the Vsyevolod-Blagodat grant of D. Polyakov, it is reported that N. V. Maurov has ordered a clam-shell dredge for the Ekaterininka placer.

In the Bogoslovsk region (of the Ural) a dredge is now installed on Gregory creek. This dredge was constructed by the Neviansk Iron Works (also in the Ural). It has a wooden hull and gantries.

The newly organized Sosva Gold & Platinum Mining Company has ordered from the Neviansk Works a dredge of the type A, with some modifications. The pontoon and gantries are of iron. The centrifugal pump and washer are operated by a separate engine. The middle size stones (*galya*), which are unwashed in the trommel, pass to the pan (*chasha*) and from there to the stacker, but the pan receives all the fines direct. The capacity of the buckets is 4.5 cu. ft. The makers guarantee the capacity of the dredge to be 100 cu. yd. in 20 hours (80 cubic *sajenes*). The date of delivery of the dredge at the works is set for July 1.

The above information, while incomplete, is sufficient to indicate that unusual activity is in progress in the matter of gold and platinum dredging in the Ural and west Siberia. To one having the slightest acquaintance with the districts in question and the somnolent methods of placer mining pursued there for the last half century, the new departure cannot but



PLATINUM-BEARING GRAVELS, TURA RIVER, BELOW BOGOSLOVSK.

cause surprise. And those who have visited the region in which the dredges are being put in operation will admit that favorable conditions exist there for the prosecution of the new industry.

An editorial in the Russian *Bulletin* in the issue of January 15, 1904, commenting on the industrial notes above translated, contains the following interesting comments:

"From the notes in the first number of the *Vyestnik* (*Bulletin*) our readers are aware that two Russian manufacturers, namely, the Neviansk and the Putilov works, are preparing eight dredges for this season's operations, four for the Ural and four for Siberia. The industry of dredge building is not such an extraordinary novelty in the Ural iron works, since the shops of Thomas Yates and those of the Korobeinikov Brothers have already constructed parts of dredges for Siberia. But the unprecedented activity during the present season in the construction of these complicated contrivances is a very favorable industrial indication. The industry of gold and platinum dredging has undoubtedly been retarded hitherto by the supposed necessity of placing orders with foreign manufacturers. The fact that dredges can be well and cheaply constructed in the Ural is now recognized, and will have a most beneficial effect on this form of placer mining.

"The first dredges shipped in from abroad were erected for the working of the platiniferous alluvials belonging to the Platinum Mining

A PEASANT TRIBUTER.

Company and to Count P. P. Shuvalov. Both of these, put in operation at the same time on the two properties, were entirely unadapted to the conditions of the ground. Granting that they were efficient, perhaps, for the purpose for which they were designed, namely, dredging the soft mud of Holland, these dredges, exceedingly expensive to the proprietors of the undertakings, were of no service in the Ural. The expected returns evaporated into thin air; breakages in all parts of the mechanism followed quickly one upon another; and the washing apparatus also proved useless, not answering the most elementary requirements.

"These abortive attempts at dredging, however, served a useful purpose They suggested, by their very uselessness, the changes which should be made in the dredges. And it is gratifying that the heavy expense incurred by the operators, due to these first unsuccessful installations, did not deter them from carrying the undertaking to successful completion. The more so since at that time the demand for dredges was uncertain in the Ural, and there were many skeptics who said mechanical contrivances were entirely unadapted to the working of our placer gravels. At that time (1901) appeared the experimental dredge of home manufacture, in the lake of the Neviansk Iron Works, and the Putilov works began to receive orders for the building of dredges. Investigations concerning the features which a gold dredge should possess, the need of adapting them, in each special case, to the character of

the ground, and the realization of the excellent conditions obtaining in the Ural for the dredging industry, all aided in bringing forth the types of dredges now manufactured by domestic firms. It has been satisfactorily shown that the Ural manufacturers can supply the demands of the mining companies, without exacting from them a great outlay for machinery unsuited to their needs.

"The Ural dredging practice to-day is necessarily in a transient stage, but with every new dredge constructed important modifications and improvements are made. Especial credit is due to the Neviansk management for the open policy pursued; its shops affording, as it were, a school in dredge construction. The fact that in the present year dredges are under construction for installation in four different parts of the Ural affords an illustration of the rapid advance which our gold mining industry is undergoing. It is true that many of the gold mining companies still work their gravels according to the time-honored methods, but the dredges and their results cannot but serve as an example of progress to all. And many areas of low-grade gravel, and even in some cases tailings, hitherto regarded as waste, will eventually be made to yield their values to these modern methods of operating."

Supplementary to the above extracts from the Russian mining journal a few notes from the writer's personal experience in the Ural gold and platinum fields of the Ural in the summer of 1902 may be of interest. On the river Tura, at a point two miles above the bridge over which the Bogoslovsk post-road crosses, a small dredge was being operated on the Jerusalem placer, belonging to Mr. Imshenetsky. A photograph of this dredge is given on another page, and as may be inferred from a glance at it, the results of its operations were highly unsatisfactory. This dredge was built in Dantzig, Germany. The shape of the buckets was not adapted to the dredging of gravel of any description, nor was it conceivable that they could by any means clean the bedrock, which was composed of limestone. The dredge was provided with no stacking ladder, the tailings being dumped directly at the end of the tail sluice, a few inches above the level of the water. The position of the boat was changed when required by means of hand winches, operating cables.

It will be noticed in the extracts given previously in this paper that a dredge of Russian manufacture is now being constructed for this placer. Despite the hard bedrock, the tenor in platinum of this and other parts of the Tura appears to be such that the operations of properly constructed dredges should be profitable. According to the statements of the owner, the Jerusalem placer, worked by wing-damming and washing in Siberian pans, has produced 7 *poods*, or approximately 3,600 oz., of platinum. The writer dug from the bank of the river, 10 ft. above the bedrock, about 15 lb. of gravel, and washed it in a small Russian pan, *kofchik*. The gravel thus panned contained 30 mg. of platinum with gold, the gold amounting to one-fifth of the whole.

The Jerusalem placer is situated at a distance of 25 miles below the mouth of the river Iss, which is the tributary of the Tura, in whose valley it is assumed that all the platinum originates. The character of the Tura platinum indicates that it has been carried a long distance, as it is in fine rounded grains of nearly uniform size, and entirely different in physical character from that coming from the Iss valley, as described above. This indicates a wide distribution of the alluvial platinum, and that the metal exists in the Tura sands in workable quantity still farther down the river is evident from the fact that for a distance of 10 miles below the Jerusalem placer, boat-shovels, like that shown in the preceding photograph, are constantly operating during the summer months. These boat-shovels, or "plows" as they are called, are operated by peasant leasers, and their operations I have elsewhere described in detail.[10]

The writer visited the Neviansk Iron Works in July, 1902, where a dredge of the bucket type was being constructed. The works are situated on the border of a lake, 7 miles in length, at a distance of 1.5 miles from the station of Neviansk, on the Perm-Ekaterinburg railway. It was said by the management that certain parts of the lake bottom had been tested for gold values, and that a tenor of 9 *doli* to the 100 *poods*, or approximately 13c. to the cubic yard, was recoverable, the bedrock lying at a distance of 35 ft. below water-level. The dredge was nearing completion and was afloat in the lake, anchored at about 100 yards distant from the shops. The hull drew 5 ft. of water and was well constructed of pine. The digging ladder was of iron and provided with 46 four-foot buckets, having lips of manganese steel. The ladder was designed to dig to 35 ft. Water was supplied by a centrifugal pump. The dredge was moved by winches and cables, no spuds being used. The washing apparatus consisted of a trommel for taking out the coarse material, from which the fines went to two tables, with back-to-back arrangement, fitted with riffles and mats. The intention was to use no quicksilver in the saving. The stacking ladder was considerably shorter than those generally in use in America. The power was steam, only 50-h.p. boiler and engines being provided. The fuel used was peat. The capacity of the dredge was estimated at 80,000 *poods* of gravel (about 1,000 cubic yards) per 24 hours. The cost of handling the material was estimated at 5c. (2 doli in fine gold) per cubic yard. The dredge was to be worked by four men on a shift, three 8-hour shifts per day. The cost of the dredge was given to the writer and was surprisingly low, but, as the dredge was not for sale, and the figure given represented the actual cost of building, the publication of it would be unfair to the manufacturers.

The Neviansk Iron Works were founded by Peter the Great in 1699, and the management of them was turned over to Nikita Demidov, a blacksmith of the Ural, in 1702. The original walls and gateway of the works were still in service in 1902, and the antiquated masonry and fittings formed a strange and picturesque contrast to the modern gold-dredge at anchor in the lake a few hundred feet away.

---

SPEED OF HAULAGE ROPES.—The speed of wire rope haulage is limited by the grades, alignment of track, condition of roadbed, etc. One factor that may restrict very high speed is the size of the rollers. At a coal mine in West Virginia a speed of 17 miles per hour is used at times in spurts, but this is too high for 4-in. rollers, and causes friction and excessive wear. A usual speed for tail-rope haulage is 6 to 10 miles an hour.

[10] *Transactions*, American Institute of Mining Engineers. *Loc. sit.*

## WEST VIRGINIA COAL MINES.

The annual report of Mr. James W. Paul, general mine inspector of West Virginia, for the year ending June 30, 1903, contains many interesting particulars respecting the coal mines of the State. Production was somewhat reduced as compared with the previous year, owing to the strike, which caused a number of important mines to remain idle for several weeks.

Coal is now produced in 24 counties in the State, McDowell county taking the lead. There were 530 separate mines or openings, a gain of 122 over the previous year; while the number of firms or companies operating was 271, an increase of 31 for the year.

Had it not been for the strike the production of coal would probably have reached 27,000,000 tons. The actual production reported is shown in the following table, in long tons:

| | Tons. | Per Ct |
|---|---|---|
| Used in operating mines | 266,691 | 1.2 |
| Local trade and tenants | 210,273 | 0.9 |
| Used in the coke ovens | 3,774,674 | 16.5 |
| Shipped from the mines | 18,662,060 | 81.4 |
| Total mined | 22,913,698 | 100.0 |

Of this total, 16,600,804 tons, or 72.5 per cent, were pick mined; and 6,312,894 tons, or 27.5 per cent, machine mined. The production by districts was as follows:

| | 1902. | 1903. | Changes. | |
|---|---|---|---|---|
| Potomac | 1,622,076 | 1,622,068 | D. | 8 |
| Monongahela | 6,431,734 | 6,679,000 | I. | 247,266 |
| Wheeling | 444,573 | 503,925 | I. | 59,352 |
| Kanawha-N. River | 8,206,865 | 6,540,325 | D. | 1,666,540 |
| Norf'lk & West'rn | 6,473,835 | 7,388,380 | I. | 914,545 |
| Small mines | 180,000 | 180,000 | | ..... |
| Totals | 23,359,083 | 22,913,698 | D. | 445,385 |

Each district showed an increase over 1902, excepting the Potomac and the Kanawha-New River, the larger decrease being in the last named district. Eleven companies produced 8,528,154 tons, or 37 per cent of the total output. There were seven other companies which produced over 200,000 tons each, and 44 each of which mined over 100,000 but less than 200,000 tons. The tonnage transported on the great Kanawha river included 36,380 tons of coal and 1,500 tons of coke.

The production of coke for the year was 2,483,376 short tons, an increase over the previous year of 233,632 tons. There were 12,694 coke ovens completed, of which 9,091 were operated during the year. At the close there were 1,646 new ovens under construction. The average production of coke was 1 ton to 1.52 tons of coal consumed in the ovens.

The average selling price of coal per long ton for the year was $1.3267, against $0.92875 in 1902. Coke sold for $2.6625 per short ton, against $1.84 in the previous year. The total gross value at the mines of the product sold was $31,649,284, after deducting coal used at mines. Some interesting statistics with regard to pick mining and machine mining are shown in the following table:

| | 1902. | 1903. | Changes. | |
|---|---|---|---|---|
| Pick mines: | | | | |
| Total coal mined | 18,223,260 | 16,600,804 | D. | 1,622,456 |
| Miners employed | 15,969 | 16,287 | I. | 318 |
| Days worked | 249 | 201 | D. | 48 |
| Tons per employee per year | 1,130 | 1,008 | D. | 122 |
| Machine mines: | | | | |
| Total coal mined | 5,135,823 | 6,312,894 | I. | 1,177,071 |
| No. of machines | 534 | 795 | I. | 261 |
| Machine employees | 4,813 | 6,581 | I. | 1,768 |
| Days worked | 249 | 201 | D. | 48 |
| Tons per machine per year | 9,618 | 7,941 | D. | 1,677 |
| Tons per employee | 1,067 | 959 | D. | 108 |

The quantity of coal mined by machine increased from 600,418 tons in 1897 to 6,312,894 tons in 1903. This was 27.5 per cent of the total coal production, and an increase over the previous year of 1,176,875 tons. From 1897 to 1903 the number of mines using machines in-

creased from 16 to 181, while the number of machines at work increased from 55 to 795 and the machine employees from 652 to 6,531 in number.

The number of men employed in and about the mines and coke ovens during the year was: Pick miners, 16,287; machine miners and runners, 6,531, and 7,632 inside laborers, making a total inside of 30,450; outside mine employees, 5,150; coke employees, 3,851, a total outside of 9,002, or a total inside and outside of 39,452. The total of all employees for 1902 was 35,147, showing an increase for 1903 of 4,305 employees. The increases were: Pick miners, 318; machine men, 1,718; inside laborers, 694; total inside, 2,730; coke employees, 447, and outside mine employees, 1,128, which gives a total gain outside of 1,575.

The mines were operated during the year 201 days, or 48 days less than during the previous year. The coke ovens were operated 234 days, or 5 days more than the previous year. In only three counties, Grant, Hancock and Tucker, were the mines operated a greater number of days than the average days worked in the State for 1902. Among the leading coal counties Fayette operated its mines 173 days; Kanawha, 167 days; McDowell, 215 days; Harrison, 227 days; Marion, 224 days; Mercer, 230 days and Tucker 250 days.

In the production of all coal from commercial mines there were excavated 3,222.3 acres, which is 129.7 acres less than were excavated the previous year.

The average price paid pick miners throughout the State per ton of 2,240 lb. for run-of-mine coal was 49.5c. for room coal and 52.06c. for heading or entry coal. There is an increase over the previous year of 2.17c. for room coal. The average price paid for screened coal was 83.3c., against 78c. in 1902, a gain of 5.3c. per ton. All other labor received from 10 to 15 per cent advance over the previous year.

Machine miners who load after the machines receive for run-of-mine coal 35c. in headings and 29c. in rooms; for screened coal, 68.5c. in headings and 53.5c. in rooms. Machine miners receive $2.525 per day and upon a weight basis, 9c. per ton. Machine miners receive from $1.75 to $2.50, or an average of $1.95 per day. While the earnings for each pick miner for the year averaged $499, against $533.56 for 1902, the daily wages averaged $2.48 for 1903, against $2.14 for 1902 for the actual time worked. This is equivalent to a monthly wage of $64.48, counting 26 days as one month's work.

The statement of accidents occurring underground, or inside mines, is as follows:

| | 1902. | 1903. | Changes. | |
|---|---|---|---|---|
| No. of employees... | 27,720 | 30,450 | I. | 2,730 |
| Av. no. days worked | 249 | 201 | D. | 48 |
| Total days' work... | 6,802,280 | 6,120,450 | D. | 681,830 |
| No. killed..... | 110 | 147 | I. | 37 |
| Killed per 1,000 employees ..... | 3.96 | 4.82 | I. | 0.86 |
| Killed per 1,000 days' work ..... | 0.0161 | 0.0240 | I. | 0.0079 |
| No. injured..... | 224 | 208 | D. | 16 |
| Injured per 1,000 employees ..... | 8.086 | 6.830 | D. | 1.256 |
| Injured per 1,000 days' work..... | 0.0329 | 0.0339 | I. | 0.010 |

The worst accident of the year was at the Algoma mine in McDowell county, where 17 persons were killed by an explosion of gas. Fifty per cent of all the accidents happened to employees having had three years and less experience in coal mines. The persons employed in and about the mines last year included a large number having no previous training in the work.

For the employees outside, or on the surface, the statement of accidents in 1903 is as follows:

| | Killed. | Injured. | Total. |
|---|---|---|---|
| No. of accidents..... | 12 | 15 | 27 |
| Per 1,000 employees..... | 1.3300 | 1.6625 | 2.9925 |
| Per 1,000 days' work..... | 0.0060 | 0.0075 | 0.0135 |

Employees at coke ovens are included in the outside men.

From 1893 to 1903 there were killed in the mines 985 persons and outside of the mines 82 persons. Seventy per cent of the inside fatalities were due to falls of roof and coal; 8.9 per cent to mine cars; 15 per cent to powder, dust and gas explosions, and 6.1 to miscellaneous causes. Of the 82 fatalities among outside workers, 79 per cent were due to mine cars; 4.9 per cent to locomotives; 2.4 per cent to machinery, and 13.7 per cent to miscellaneous causes.

Miscellaneous statistics show that at 257 mines there were 612 steam boilers, being an increase of 41 mines and 52 boilers over the previous year. A total of 231 steam, electric and compressed air locomotives were in use at 145 mines, a gain of 58 locomotives during the year. The number in 1903 included 74 steam, 154 electric and three compressed air locomotives. McDowell county leads with 60 locomotives at 22 mines. Reports from 279 operations showed that 249,323 kegs of powder were used in mining 17,863,804 tons; an average of a keg of powder for 72 tons of coal. The powder was sold at an average price of $1.71 per keg, or 12c. less than during the previous year.

The mining industry was much retarded by a strike, which was called by the officials of the United Mine Workers of America for the purpose of inducing the operators to agree with the organization upon a scale of wages. This call, effective from June 7, 1902, was largely observed by the mine workers along the Kanawha and New River and in a few other sections of the State, but the strike order was most effective in Fayette and Kanawha counties. The history of the mining industry of this State would be incomplete without mention of the consequences of this strike. The operators in the New River field resisted and refused all overtures made by the strikers, and matters were so serious that a part of the National Guard of the State was brought into service. In the process of legal proceedings a number of persons were injured and several lost their lives in a conflict with officers of the law. The strike was partially broken in some sections by the importation of new men. In October, 1902, some of the operators in Fayette and Kanawha counties made amicable agreements with the employees and work was resumed and in April, 1903, the Kanawha operators signed a joint scale agreement and all employees resumed work. In the New River field a great many of the men returned to work and by May only a few of the men remained idle. In July, 1903, the officials of the United Mine Workers declared the strike off.

An attempt has been made to secure a full report of this strike, but in many instances the reports made by the operators were incomplete. Fifteen counties reported 171 mines having been affected by the strike. This is nearly 50 per cent of the total number of mines within the State. Only 39 of the 171 mines made full reports concerning the strike. Fifty-seven reported a total loss in wages to the employees of $745.551, and forty mines reported a loss sustained by the operators of $340.550. The total number of men thrown out of employment at the 171 mines was 16,405.

The five district inspectors made a total of 1,197 inspections during the year, besides investigating the causes of fatal accidents. This is an excellent record. Mr. Paul urges the necessity of a larger force. It is impossible for one man to make four annual inspections of 125 mines, besides making examinations into fatal accidents and sampling the oils used in his district. At least three additional inspectors are urgently needed.

## CYANIDE IN THE STAMP-MILL.

In a recent paper Mr. I. Roskelley, of the Robinson Deep mine, at Johannesburg, states[1] the reasons for and against the use of potassium cyanide in the mill. Stated briefly, the objections to using cyanide in the mill are: (1) It dissolves gold on the plates; and (2) it interferes with the pulp after leaving the mill.

The advantages accompanying the use of cyanide are perhaps better known to mill-men who have the practical handling of the amalgamating tables, than to anyone else. They are:

1. It greatly assists in the setting and dressing of plates by causing the mercury to spread and mix with the amalgam. Two men who can set a copper plate well in an hour, using cyanide, will require twice that time without it, and even then the result is not good.

2. It keeps the plates in good condition. When cyanide is used, plates are seldom seen discolored with streaks of yellow, oily-looking scum, as often occurs with certain ore when it is not used. It has been affirmed that this discoloration can be done away with by feeding a little lime into the mortar boxes, but I have not found lime very effective. The use of lime ought to be avoided, since it interferes with the amount required in settling the slime, and for this reason, since it is of small use in the mill, I have discontinued it. Cyanide, when used in dressing plates, removes this yellow scum which forms on the lower part of the plate, and since the dressing is done every four hours, it prevents it from appearing in any quantity. The amount of gold caught on the lower part of the plate is small, and the loss in gold, therefore, owing to the presence of this scum, is slight, but the escape of mercury to the cyanide works, which it causes, is another matter. When plates are in good condition, the mercury which is applied in dressing oozes through the amalgam down the plate and never appears on the surface. Immediately the oozing quicksilver reaches one of these discolored patches, it rises to the surface and drains down the plate in 'tears.'

3. It thoroughly cleans copper plates of grease and foreign matter, which would interfere with 'setting.' Some time ago I started taking samples in the mill, to see how far the evils advanced against the use of cyanide were real ones. It may be stated here that for dressing plates I use one-half ounce of cyanide dissolved in four gallons of water, and that this is sufficient for 10 tables. In setting plates I sometimes use a slightly stronger solution, but since this occurs seldom, it need not be considered. Cyanide is never used in the Robinson Deep mill, except for dressing and setting plates, but it soon became quite evident to me that either the use of cyanide must be discontinued to the detriment of the amalgamation, or else a certain amount of gold must be dissolved and partly lost, thereby giving trouble to the cyanide works. Both of these I was unwilling to do, and at last it

[1]The *Journal* of the Chemical, Metallurgical and Mining Society of South Africa. February, 1904.

struck me that both my troubles might disappear if I washed off the dressing solution, before letting the stamps fall, and collected it at the bottom of the table. The first wash of the plates is now collected regularly, after dressing, with a trough which is rectangular, about 4 in. deep and 2.5 in. wide, and goes the whole length of the table. These washings are stored in tanks.

While, therefore, the indiscriminate use of cyanide in a mill is distinctly harmful; if used in small quantities and special precautions taken against its escape to the cyanide works, it is beneficial. Using large quantities, and not collecting the washings, may contaminate the water supply of the mill on those mines that return the water after only a short interval.

The time lost in collecting the first wash of the plate is infinitesimal, something like five seconds.

---

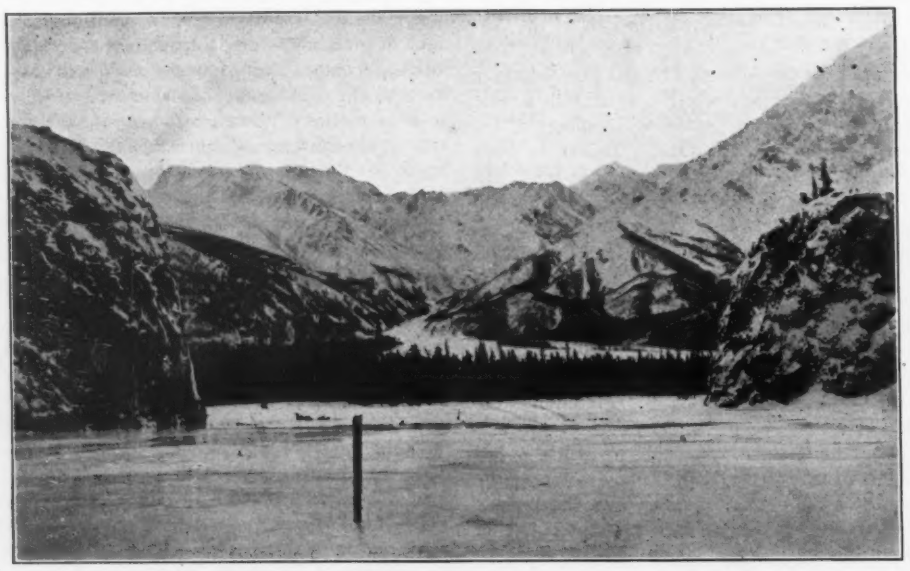
GERMAN IRON PRODUCTION.—The output of the German blast furnaces in March is reported by the German Iron & Steel Union at 850,340 metric tons of pig iron; which is 69,880 tons more than in February. For the three months ending March 31 the output was as follows, in metric tons:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Foundry iron ..... | 429,436 | 442,266 | I. 13,830 |
| Forge iron ..... | 221,669 | 207,673 | D. 13,996 |
| Steel pig ..... | 204,779 | 143,374 | D. 61,405 |
| Bessemer pig ..... | 86,901 | 122,171 | I. 35,270 |
| Thomas (basic) pig... | 1,448,247 | 1,546,369 | I. 58,122 |
| Totals ..... | 2,391,032 | 2,461,853 | I. 70,821 |

Under steel pig are included spiegeleisen, ferro-manganese, ferro-silicon and all similar alloys used in making steel.

---

GEOLOGICAL SURVEY OF ALASKA.—The first field party of the United States Geological Survey to leave Washington this year is, as usual, the Alaskan contingent. During the past winter Congress increased its appropriation for Alaskan work from $60,000 to $80,000. Nine parties will be engaged there during the coming season in topographic and geologic work. Besides these, three sub-parties will take up special work, so that the number of Survey investigations on foot in Alaska during the summer will be 12 as against seven of last year.



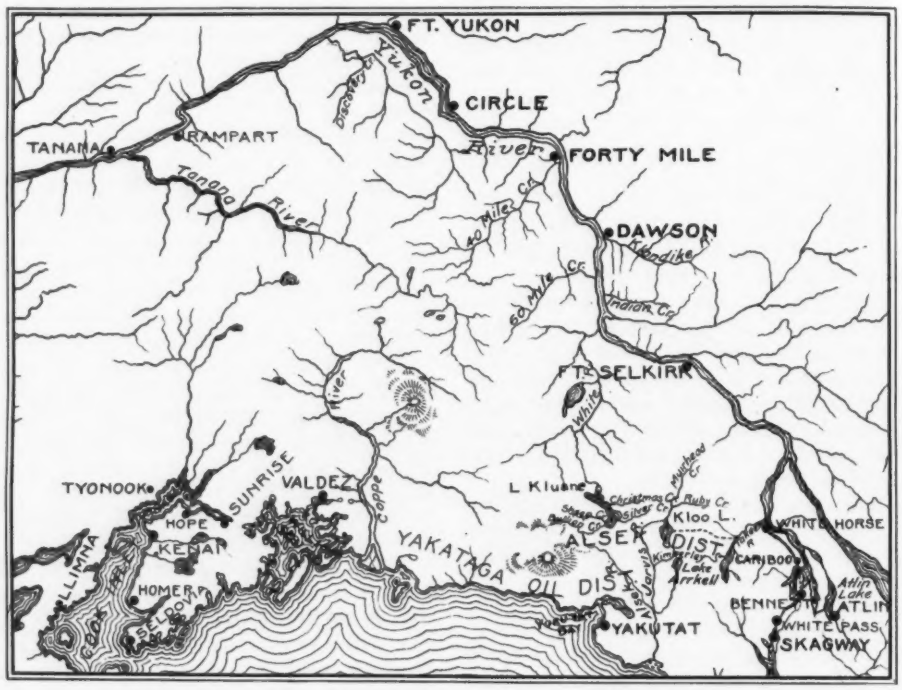
VULCAN CREEK, ALSEK DISTRICT.

## THE ALSEK MINING DISTRICT.

By W. M. Brook.

Last summer a new placer gold-field was discovered by Dawson Charley and three other Indians. This is known as the Alsek district and is situated in the Northwest Territory of Canada, near the Alaska border. Yakutat Bay, Alaska, is the nearest salt-water harbor, being about 80 miles from the central section of the camp. The first gold was found last June on Ruby creek. Prospects were found running from 40c. to 50c. to the pan. This discovery is 165 miles west of White Horse on the White Pass & Yukon railroad. The news became circulated early in July along the Upper Yukon and a stampede of 500 or 600 miners followed. As a result of this exploration, numerous creeks draining an area of over 30 miles square were found to contain gold in paying quantities.

Smith and party, of Haines Mission, Alaska, discovered in October the richest prospects on streams they named Bullion and Sheep creeks. They are about 35 miles southwest of Ruby creek. Small sluice-boxes were used on Ruby and Bullion creeks a few days before the season closed. On the latter stream the pay-streak, where exposed, averaged about 10 ft. in thickness; the width has not yet been determined. Locations have been recorded on ten creeks, with their tributaries, entering into Kluane (Kloo-Annie) lake and on eight creeks running into Kloo lake.




SKETCH MAP SHOWING SITUATION OF ALSEK DISTRICT.

Generally speaking, from the many prospects found the gold is coarse and rough. It is very dark in color, showing presence of impurities. The largest nugget found was worth $8. This is high-grade bullion, assaying from $18 to $18.50 per ounce. Copper nuggets have been found on a number of these creeks. More float quartz has been found in this new district than in any other placer camp in the North. There is an abundance of water, and lots of grade on most of these streams. A sufficient quantity of spruce timber of a fair quality can be secured conveniently for lumber and fuel.

Owing to the difficulty in getting in provisions last fall, very little actual mining was done. Three town-sites have been taken up, namely, Ruby City, Bullion City and Sheep Camp. Ruby City will be the distributing center this year for the district. The winter trail from White Horse to this new settlement was opened early in the season and a large amount of freighting has been done. Twenty cents per pound is now the freight rate on the trail. Dogs are depreciating in value and horses are taking their places as the season advances. Road-houses have been established at convenient distances along the route for the accommodation of the traveling public. This is a very profitable business in all new mining camps.

Gov. Congdon, before making his winter visit to Ottawa, stopped at White Horse while on his way to eastern Canada, and after his investigation of new diggings made the statement that $30,000 would be available for the construction of a summer wagon-road from White Horse.

The Northwest Territory mining act allows a placer claim location 250 ft. on the stream and 1,000 ft. on either side from base line; 1,000 ft.

is allowed for discovery placer claim or 1,500 ft. for two locators. A miner's license costs $7.50 per annum. The fee for recording claims is $10 per annum. Instead of 'representing' in open season, $200 comprises annual assessment work. The royalty has been cut down to 2 per cent on gross output. Discoverers on each creek are exempt from royalty.

The Alsek district is situated in one of the favorite Indian hunting grounds. The wild game, the mountain trout and grayling, and many miles of hay meadows offer the incoming miners more special inducements than can be had in almost any other mining camp in the North. Adjacent to this camp considerable unexplored territory yet remains. The extent and richness of the district will be determined more definitely by the close of the mining season this year. The best summer route this season will be by way of the Dalton trail from Haines Mission, Alaska, which is 20 miles south of Skagway. The distance is about 200 miles.

ENTRANCE TO SHEEP CREEK, ALSEK DISTRICT.

The accompanying illustrations were obtained from photographs taken under extreme difficulties in midwinter with the thermometer registering from 40° to 66° below zero. They were secured by Mr. L. P. Muirhead, formerly from the Atlin. These are the only photographs that had been taken of the new diggings up to last March.

No. 1 shows Vulcan creek, where the formation is identical to that on Bullion creek, with a little more grade. The mountains in the background are composed of a mass of yellow quartz. No. 2 shows pioneer miners on the shores of Kluane (Kloo-Annie) lake, showing mode of travel. The illustration is a typical one. The sail on the sled is generally used with fair wind in crossing lakes. No. 3 shows the entrance to Sheep creek, and is also a typical view. The map is drawn from a portion of a large map published by the Alaska Steamship Company.

---

A NEW WELSH COAL FIELD.—According to our English contemporary, *Coal & Iron* (April 18, 1904) a syndicate has been formed to acquire a tract of territory known as the Morfa Marsh at Llanelly, which it will develop on an extensive scale. The occurrence of the lower coal-measures has already been proved by boring operations.

## PETROLEUM PRODUCTION OF RUSSIA.

The petroleum industry of Russia during the year 1903 is the subject of a recent report issued by the Department of Commerce and Labor at Washington. As for many years past, the report has been prepared by J. C. Chambers, United States Consul at Batum, who has shown commendable skill and energy in carrying on this line of investigation.

The decline in the production of the Baku wells which began in 1902 was continued during the past year, the total output in the former year being 76,383,463 bbl. and in the latter 71,626,611 bbl., showing a falling off of 4,756,852 bbl. It is believed, however, that the statistics reported as official are somewhat misleading and that the actual decrease was less than the figures indicate.

PIONEER MINERS ON SHORE OF KLUANE LAKE.

About the middle of July (old style) a general strike occurred at Baku, resulting in the stoppage of work of every description for from 10 to 20 days, with a loss in the output estimated at 2,100,000 bbl. This was followed in September by a destructive fire in the Bibi-Eibat district which destroyed 62 rigs, many of them pumping wells, entailing a loss in oil of not less than 2,100,000 bbl., as the estimated quantity of oil in reservoirs that was destroyed was about 1,000,000 bbl., while the loss from flowing wells was even larger.

The daily average production of the Baku fields in 1902 and 1903 are shown below, in barrels of 42 gal. each:

| | 1902. | 1903. | Changes. |
|---|---|---|---|
| Flowing wells..... | 31,160 | 17,591 | D. 13,569 |
| Pumping wells..... | 178,110 | 178,646 | I. 536 |
| Total ..... | 209,270 | 196,237 | D. 13,033 |

Notwithstanding the stoppage of pumping in July and the destruction of the Bibi-Eibat wells, the average daily production from pumping in 1903 was greater than in the preceding year; consequently the only falling off in output was from flowing wells. That there should be less oil every year from flowing wells seems only a reasonable inference, considering the age of the territory, the number of wells drilled, and the consequent gas drainage; however, there is considerable of the Bibi-Eibat territory which has not been drilled, and which is undoubtedly very rich. It is exceedingly probable that the future flowing wells will be obtained in that territory and that the limit of production in that district has not yet been reached. It was the only district which showed an increase in production last year.

The number of wells brought in during the past year was 189, with an average depth of 1,296 ft., as compared with 236 wells and an average depth of 1,302 ft. in 1902. Notwithstanding the greater number of wells completed in 1902 than in 1903, the increase in the average number of wells producing in the latter year was greater than in the former, the figures showing the increase in average number of wells producing in 1902 to have been 15, while the increase last year was 53. However, there were only 23 more wells producing in December, 1903, than in the same month of the previous year, so that it would seem that it will take considerably more drilling to

materially increase the number of producing wells.

At the close of 1903 the total number of wells in the Baku fields was approximately the same as in the corresponding period of 1902, being distributed as follows:

| | 1902. | 1903. | Changes. |
|---|---|---|---|
| Balakhani-Sabunchi | 2,666 | 2,665 | D. 1 |
| Romani | 427 | 429 | I. 2 |
| Bibi-Eibat | 338 | 340 | I. 2 |
| Total | 3,431 | 3,434 | I. 3 |

The feature of water in the wells in all the districts grows more threatening steadily. The strike last year, however, developed the (to American producers) remarkable fact that a shut-down of from 15 to 20 days of pumping wells which were producing from 30 to 70 per cent water resulted in little or no damage to the wells, the production in the first month after the shut-down being fully up to that of the month preceding it.

No new territory was developed during 1903. The well of Messrs. Nobel Brothers, at Berekei, 170 miles northwest of Baku, mentioned in the report from this consulate last year as starting off at over 1,000 bbl. per day, was still producing considerable oil up to the beginning of this year. Although drilling for other wells in the vicinity was reported some time ago, none of these wells has as yet proved a producer.

The refining business continued unsatisfactory until about October 1, when an unusual demand for refined oil for export resulted in a very sharp advance in the prices of refined, and in fact the advance was sharp in the prices for all products, crude naturally sympathizing with refined. The average price of refined up to the end of September was not at all profitable, but the advance in October was nearly 150 per cent, and, while crude advanced also 100 per cent, the advance in residuum and refined made refining a very fair business. Since the breaking out of the Russo-Japanese war there has been a slight decline in the prices of refined and crude, but this can hardly be more than a temporary decline, in view of the falling off of the volume of production and an anticipated increase of transportation facilities to the Black Sea.

The shipments of all petroleum products from the Baku district in 1902 and 1903 were as follows, in gallons:

| | 1902. | 1903. | Changes. |
|---|---|---|---|
| Illuminating oil— | 601,035,000 | 731,790,000 | I. 130,755,000 |
| Lubricating oil— | 71,590,000 | 82,005,000 | I. 11,415,000 |
| Residuum— | 1,711,800,000 | 1,516,770,000 | D. 195,030,000 |
| Crude— | 170,350,000 | 131,985,000 | D. 38,365,000 |
| Total— | 2,554,775,000 | 2,463,550,000 | D. 91,225,000 |

There was practically no increase in the transportation capacity from Baku to the Black Sea last year, but the Novorossisk route was used more than in previous years, owing to the increase in the demand for refined oil for export exceeding the capacity of the Baku-Batum route. It has been explained in previous reports from this consulate that refined oil is carried from Baku in tank cars to Michailovo, and thence pumped through an 8-in. pipe line to Batum, and that the work of constructing a through line of 8-in. pipe from Baku to Batum was progressing. From Baku to Batum the distance is about 560 miles, of which the line from Michailovo to Batum covers 143 miles.

## ROCK DRILL TESTS.

In a paper read before the Mechanical Engineers' Association, an abstract of which appears in *South African Mines* of March 19, 1904, Messrs. J. B. Carper, W. C. Docharty and E. Goffe give the results of some tests of rock drills. The authors endeavored to conduct a fair and unbiassed trial of all the rock drills procurable, which represent nearly all of those on the Johannesburg market. The trials were made at the City & Suburban gold mine during September, October and November, 1903. The object was to obtain the quantity of air consumed by the different makes and sizes of drills while doing the same work. The method adopted was as follows:

All the holes were drilled in a block of red granite, 4.75 ft. by 4.75 ft. by 2 ft. thick, having the density and hardness of Peterhead granite. This block was from the Bank granite quarry, and was chosen for this purpose and set by the late Major Seymour, who originally intended to carry out trials on these lines. This granite block was firmly set in the ground in a bed of concrete, and had a quarry bar fixed across it at a height of 3 ft., supported at each end by posts and A frames, firmly set in the concrete. A second quarry bar had one end clamped to the fixed bar, with its outer end supported by a post with broad flange base, and could be traversed the whole length of the fixed bar. The machines were clamped either on the fixed bar or the traversing bar, thereby rendering possible the drilling of any spot on the face of the stone. All the test holes were driven vertical. There were two air receivers, each 5 in. diameter by 20 ft. long, placed side by side, about 2 ft. apart, connected by one piece of 8-in pipe with valve, this valve being kept wide open. An iron pipe 2 in. diameter, 18 ft. long, led the air from the receiver to the test stove. It was provided with a stop valve at the end, and was fitted with pressure gauge and thermometer tube near the stop valve. A flexible hose attached to the end of the 2-in. pipe supplied the machines. The capacity of the two receivers, including piping up to the stop valve, was 756.5 cu. ft. At the time of the tests the pipe connection from the receivers to the mine was entirely disconnected and blank flange put on the receiver. The machine was then stopped and the depth of the hole carefully measured and recorded. The times of starting and stopping were taken, and lengths of any stoppages during the run noted, the net time of the run being thus found. The machine was then restarted at 70 lb. pressure and run to 60 lb. and again measured, and so on for each stage down to 35 lb. Before starting a hole the bit was carefully measured. In starting and stopping each stage of the run, the pressure and temperature of the air passing through to the machine was observed, as well as the atmospheric pressure shown by barometer. It was intended originally to go through all the stages of pressure for each drill with one hole, but the stone being proved to be too thin, this scheme had to be modified, and the plan was adopted of running the first two stages only, viz., 80 lb. to 70 lb. and 70 lb. to 60 lb. in one hole, then starting a new hole with new drill bit and running three stages, viz., 60 lb. to 50 lb., 50 lb. to 40 lb., and 40 lb. to 35 lb.

In working out the results, the capacity of the receivers was calculated for every pressure observed, corrected for temperature and barometer reading, and reduced to the equivalent of free air at a temperature of 70 degs. F. and 24.8 in. barometer. The capacities of the holes drilled were calculated. The results may be summarized as follows:

*3½-in. Machines.*—One 3½-in. bore machine, a Hercules, was tested, which gave fair drilling results, with an air consumption of 16.86 cu. ft. per cu. in. drilled.

*3¼-in. Machines.*—New machines tested were the Climax, Little Vixen, Ingersoll, Holman, Slugger, Hirnaut and Little Giant. Comparing the 3¼-in. diameter new machines tested, the Slugger shows the lowest average air consumption for the whole range of pressures from 80 lb. to 35 lb., viz., 11.08 cu. ft. per cubic inch drilled, and in addition shows the lowest air consumption for any single stage of the whole test, viz., 8.70 cu, ft. per cubic inch drilled. The second best result was obtained from the Little Giant, which showed an average consumption of 11.74 cu. ft. of air per cubic inch drilled. These two machines gave the most satisfactory runs, working the most smoothly and without interruption, and giving the least trouble in every way. In every stage of air pressures these two machines also show the lowest air consumption. It was intended to test some worn machines for comparison, and a Little Giant, about three months old, was brought straight up from the mine at the City & Suburban and put on the bar. A Climax Vixen was obtained from the manager of the Ferreira Gold Mining Company, but owing to a misunderstanding a practically new machine was sent, so that the runs are not properly comparable.

*3⅛-in. Machines.*—Two new 3⅛-in. Slugger machines were tested, one being taken out of its packing case at the test bar, which gave a consumption over the whole range of pressures of 10.92 cu. ft. of air per cubic inch drilled. This machine worked stiffly at first, and in consequence did not show so good a record in the higher stages. The second 3⅛-in. Slugger was quite new also, but before starting the test was adjusted for sinking work by the removal of a plug in the valve chest—provided for that purpose—which gives a more free movement of the air in the machine. The average consumption of this machine, was 10.52 cu. ft. of air per cubic inch drilled. This is the most economical in consumption of air of the machines of 3-in. bore and upwards.

*3-in. Machines.*—There were four makes of these tested, the Hercules, Little Vixen, Water Leyner and Daw, of which the Hercules proved the most economical, with a consumption of 15.11 cu. ft. of air per cubic inch drilled. This appears to be a good and handy machine and worked very satisfactorily. The Water-Leyner was given two runs, at the higher stage pressures, 80 lb. to 60 lb., with an average of 21.52 cu. ft. of air per cubic inch drilled, but was not tried below 60 lb., the agent not considering that this machine—the only one available at the time—was suited for use at lower pressures.

*2 15-16-in Machine.*—An Ingersoll machine of 2 15-16-in. bore was tested by request of the manager of the Jumpers Deep, Ltd. The drill consisted of an ordinary 3¼-in. machine fitted with a cast-iron bush bored to 2 15-16 in. and a piston turned down to suit. The machine was in first class condition, and did very good work. Its average consumption was 13.92 cu. ft. of air used per cubic inch drilled.

and its drilling power was fully equal to that of the regular 3.5-in. machine with a greater economy of air.

*2¾-in. Machines.*—Tests were made with two 2.75-in. machines, a Climax and a Slugger, each being run with both 2-in. and 3-in. drill bits with the idea of finding out whether a small machine was capable of drilling a full hole economically. Owing to difficulties in using small bits, and to the drill going right through the stone in some cases, the tests could not be carried out in identical stages. The Slugger showed to advantage with both small and full size bits, the air consumption being respectively 10.45 and 11.09 cu. ft. per cubic inch drilled. In both depth of hole drilled with full size bits and economy of air, the 2.75-in. machine was quite equal to the larger machines.

*2½-in. Machine.*—A 2.5-in. bore machine, the Climax Little Vixen, was tested at the request of Mr. Marley, manager of the South Deep, who, it is understood, had been using it in regular development work. The machine was run with a 2-in. bit, and worked satisfactorily, but the consumption of air was 20.29 cu. ft. per cubic inch drilled, or nearly double that of the 2.75-in. Slugger with the same size bit.

*2¼-in. Machines.*—Two 2.25-in. bore machines, the Hercules and the Little Giant, were tested through some of the stages. The Little Giant was the more satisfactory in its work and its air consumption, 19.48 cu. ft. per cubic inch drilled, was the more economical.

### THE KRAUSE ATMOSPHERIC STAMP.

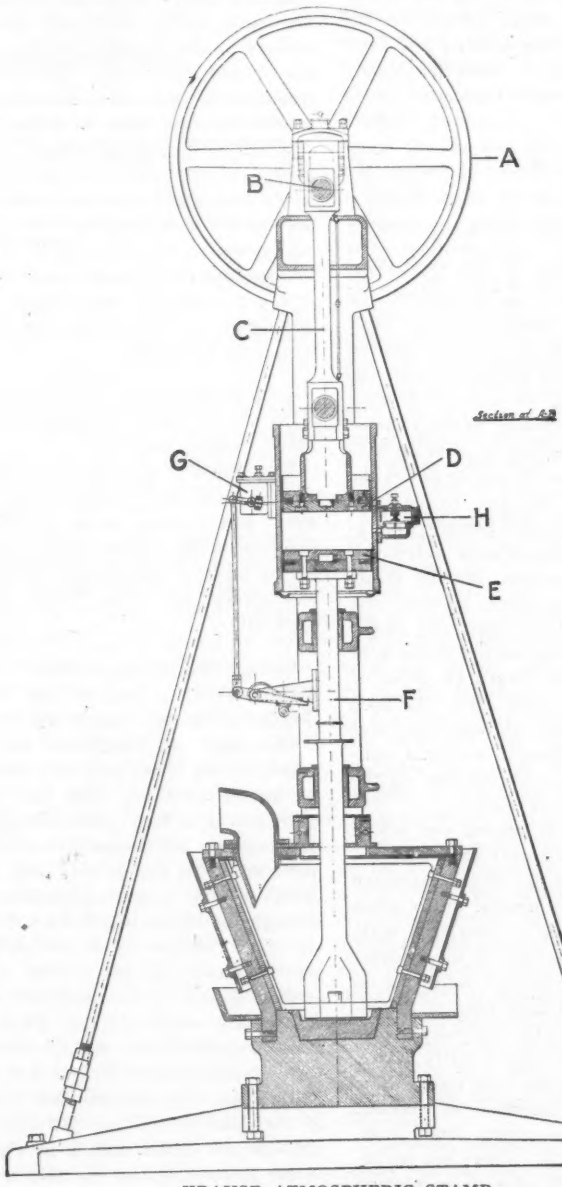
The accompanying illustration is a sectional view of a stamp devised by Mr. C. H. Krause and manufactured by the Allis-Chalmers Company. The design is the result of the inventor's long experience in the Lake Superior copper country, where the steam stamp, with its heavy duty, is in general use.

The special points of this crushing mechanism can be briefly stated. To the falling weight of the stamp is added the velocity attained by the stamp-shaft through compression of the air between the pistons traveling at the high rate of speed of 190 strokes per minute, for a length of stroke of 14 in., and this power is applied with the least possible friction losses. The productive capacity of this machine is obtained through the medium of the stamp-shaft, weighing 1,000 lb., dropping at the rate of 190 times per minute, and with the additional force obtained from the velocity of a downward movement, at the rate of 1,200 ft. per minute at the end of the stroke. The result is the rapid reduction of the rock which is very rapidly discharged through a four-way mortar with large screen surfaces assisted by a powerful splash produced by the rapidity and force of the stamp-shaft.

The inventor claims that this stamp can be used to advantage in stamping gold-bearing rock which has hitherto been done in various forms of gravity batteries. The atmospheric stamp will have a larger capacity than 10 gravity stamps, and will require less attention and attendance. The stamp at the Mass mill has a record of reducing through a 16-mesh screen a hard Michigan trap rock, ranging from 1.5 in. to 2.25 in. of 58 tons in 24 hours.

It can be used, also, in the secondary reduction of rock which requires crushing to fine meshes to release the mineral product as in the case of jig middlings and coarse table tailings, which work is now being done by Huntington and Chilean mills. There is less sliming of the product and the material is therefore easier to save on regular forms of slime concentrating machinery. There is no rubbing or grinding action in the atmospheric stamp, as in the case of any type of roller mills. Records of sizing tests obtained on native copper material show that the proportion of slimes over 100-mesh is very small as compared with the same material handled by Chilean mills.

As shown in the drawing, the power is transmitted through a 5-ft. cast-iron pulley carried by the crank-shaft, which has a 6-in. throw, producing a 12-in. stroke. The bearing in the entablature for the crank-shaft on the pulley side has been made especially large and strong to carry the pulley and belt strain. A connecting rod, with brass boxes on each end, connects the crank-shaft to the cross-head and upper piston. The cross-head is of cast-iron and the upper piston is bolted to this.




KRAUSE ATMOSPHERIC STAMP.

Two pistons work in the cylinder. The cylinder is of cast-iron and is 2 ft. 8.5 in. long, and 18 in. in diameter. The upper piston is connected to the crank-shaft, while the lower piston forms the head of the stamp-shaft. These pistons are fitted with spring rings angular in shape and so fitted that no vibration or shock to stamp-shaft can be communicated to cylinder.

The stamp-shaft is a steel forging 7 ft. long, ending in a foot which is dove-tailed to receive a tongued shoe. This shoe is held in place by a tapered key. The mortar rests on a heavy cast-iron block, 12 tons in weight. It is bolted to the mortar-block by means of four 2-in. bolts extending through lugs cast on the mortar block. The dimensions of the mortar for secondary reduction purposes are as follows: The base of the mortar is 42 in. square, and inside height 2 ft. 6.5 in.; the mortar is a four-way mortar discharging on all four sides and has a total screen area of 2,300 sq. in., thus insuring a rapid discharging of the material. It has four chilled iron mortar liners at the corners which serve also as screen supports, and the screen-frames are also constructed of chilled iron.

In operation the piston *D*, actuated by the crank-shaft *B*, through the connecting rod *C*, as it moves upward, produces a partial vacuum between the pistons which causes the lower piston to rise also, and with it the stamp-shaft *F*. The tappet on the stamp-shaft coming in contact with the horizontal lever raises the vertical stem which opens the inlet-valve, thus admitting atmospheric pressure between the pistons. This inlet valve is a rolling valve especially designed for high speeds and under perfect control, to permit entrance of air

automatically into the cylinder. The adjustment of this valve is by a clamp connecting arm secured to the valve-stem on which it can rotate to any desired point. Contained in the same valve casing above the rolling valve are two brass valves horizontally seated which prevent any escape of air from the cylinder when the upper piston starts on the down stroke. These valves are positive in their action, two in number and of large area. The stamp-shaft, having received an impetus upward through the creation of the partial vacuum produced by the upper piston moving upward, continues in its upward movement until arrested by a cushion or high initial pressure caused by the down-coming upper piston *B*, which then drives the stamp down with increasing velocity and force until, at the end of the stroke, both the velocity and force have reached their maximum and a powerful crushing blow is delivered. Before the lower piston begins its descent and when equilibrium is restored between the pistons, the two valves, as described above, close automatically and no air can escape from the cylinder with both pistons in their upper position. The lower piston at this time is also above the exhaust port, so that no air can escape through the exhaust-port valve, which is a flat valve loaded with a spring to give it the desired pressure. When the lower piston *E* passes the exhaust port, no air will be exhausted while the stamp is operating normally, as this exhaust valve is loaded with a spring, to coincide with the normal pressure when the piston passes the exhaust port. But if, for any reason, this pressure is raised above the pressure represented by the spring, the exhaust valve will exhaust the excessive pressure, thereby insuring normal terminal pressure between the pistons when they are at the lower end of the stroke. This fact also insures the forming of the partial vacuum for the return up-stroke of the stamp-shaft at the proper time. As little or no pressure is exhausted through the valve when the stamp is operating in a normal condition, no power whatever is lost, but all the pressure is put into effective work.

When the stamp is first started and before the stamp makes its full travel of stroke, the valve will exhaust by reason of the increased volume of air between the pistons. Also, when the operation of the stamp is interfered with, in such a way that the pressure in the cylinder becomes greater than the load of the spring on the valve, the exhaust at once relieves the increased pressure inside the cylinder. This action makes this exhaust valve a safety device.

In operation the stamp has been found to be automatic, requiring no attention in running. After being adjusted to a proper stroke it requires no further attention. There are no repairs needed for the stamp, save those wearing parts used chiefly in crushing the rock, such as stamp-shoe and die and mortar-screens. All other parts of the stamp have been designed for long wear and service. The weight of the machine complete, including mortar block, is 45,000 lb. The shape and size of the mortar can, of course, be made to suit the special work.

---

DEEP OIL STRATA IN RUSSIA.—It is reported that a test well on the island of Tcheleken has encountered oil at a depth of 1,067 ft., showing the existence of a new oil-bearing stratum below that now exploited. When first struck the oil spouted to a height of 200 ft. and contained no water.

## RECENT LITERATURE ON ECONOMIC GEOLOGY.—XIII. LEAD AND ZINC.

By H. FOSTER BAIN.

*Geology of Miller County.* By S. M. Ball and A. F. Smith, with an *Introduction* by E. R. Buckley. Missouri Bureau of Geology and Mines. Vol. I. Second series; pages, 197.

In this report a description is given of the stratigraphy and resources of one of the counties in central Missouri, from which small shipments of lead and zinc are made. The rocks include nearly horizontal dolomites and sandstones of Ordovician and Cambrian age with isolated outliers of Lower Carboniferous limestones and coal measure shales. The ores are found mainly under and around the shale pockets, which occupy solution channels and pits in the older rock. The bulk of the ore comes from the Gasconade limestone, with smaller amounts from the higher St. Elizabeth and Jefferson City formation. They are regarded as concentrations due to underground water, and in their present form and condition the work of descending waters. The total production to the close of 1902 is estimated as follows: Lead ore, 2,210 tons, value $109,680; zinc ore, 3,000 lb., value $49.50. The known ore-bodies are not large, but the region is largely undeveloped.

---

*Geological Survey of New Jersey, Annual Report of the State Geologist,* 1903. The Zinc Mines; pages, 108.

The output of zinc ore for 1903 is given as 279,419 gross tons, a gain of 70,023 tons over 1902. Development work continued through the year in the Parker, with a diamond drill, but no new ore-bodies were discovered. Work was carried on in the Taylor mine and the open cut.

---

*Recent Zinc Mining in East Tennessee.* By Arthur Keith. *Bulletin* 225, United States Geological Survey; pages 208-213.

The mode of occurrence and the stratigraphy of the rocks in which these ores occur are briefly discussed. Zinc has been found at many points in East Tennessee, but the recent developments are confined to an area about 40 miles long, less than a mile wide, and running in a general northeast-southwest direction through the center of the East Tennessee valley. The deposits are all within two miles of the Southern Railway. The localities described are on Love's creek, five miles northeast of Knoxville, close to McMillan station, nine miles northeast of Knoxville; two miles west of Mascot station; one-half mile east of Newmarket; one and one-half miles southeast of Newmarket, and at Jefferson City. The deposits are found mainly in the upper part of the Knox dolomite, the principal formation of the region. It consists of massive limestone and dolomite more or less cherty. The dip is 40° to 45° near Knoxville and 10° to 20° near Newmarket and Jefferson City, where the zinc-bearing rocks are near the plane of a great overthrust fault. Carbonate and silicate near the surface are succeeded by sulphides 10 to 20 ft. below. The deposits are now worked by open cut. The ore-body consists of a mass of brecciated rock, the blende with calcite occupying the interstices. The largest body exposed is at Jefferson City, where open cuts have developed it along a north-south line 600 ft., with an average width of 75 ft. and a depth of 20 to 40 ft. The ores are believed to be due to concentration by cold surface waters.

## BOOKS RECEIVED.

**In sending books for notices, will pubishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.**

*The Emerald Book.* San Francisco, Cal.; Compiled and Published by Shreve & Co. Pamphlet, 20 pages.

*American Chamber of Commerce in Paris. Year-Book for* 1904. Paris, France; published by the Chamber. Pages, 112.

*Coal Statistics. Eighth Edition,* 1904. Philadelphia; compiled and published by Alder & Ruley. Pages, 204; with maps. Price, $1.

*A Dictionary of the Plant Names of the Philippine Islands.* By Elmer D. Merrill, Botanist. Manila, P. I.; Bureau of Public Printing. Pages, 196.

*Die Galvanoplastik.* By Dr. W. Pfanhauser. Halle-a.-S. Germany; Wilhelm Knapp. Pages, 140; illustrated. Price (in New York), $1.40.

*L'Industrie Aurifère au Transvaal. Son Passé—Son Avenir.* By Albert Michaut. Paris, France, 1904: A. Lahure. Pages, 156; illustrated.

*Tasmania. Report on Clay Deposits at St. Georges Bay.* By W. H. Twelvetrees. Pages, 10. *Report on the Stanley River Tin-field.* By G. A. Waller Hobart, Tasmania; Government Printer. Pages, 20; with map.

*Western Australia. Statistical Register for the Year* 1902. *Parts* 3 *and* 11. Compiled in the Government Statistician's Office. Perth, W. A.; Government Printer. Pages, 36 and 54.

*The Slav Invasion and the Mine Workers.* A Study in Immigration. By Frank Julian Warne. Philadelphia and London; the J. B. Lippincott Co. Pages, 212; with maps. Price, $1, net.

*English and American Steam Carriages and Traction Engines.* By William Fletcher. London, New York and Bombay: Longmans, Green & Company. Pages, 428; illustrated. Price, $5, net.

*Die Wohlfahrts-Einrichtungen der Arbeitgeber zu Gunsten ihrer Angestellten und Arbeiter in Oesterreich.* Prepared in the Imperial-Royal Office of Statistics of Labor. Vienna, Austria; Alfred Hölder. Pages, 416.

*Dynamo-Electric Machinery. Volume I. Continuous Current Machines. Seventh Edition.* By Silvanus P. Thompson. New York: Spon & Chamberlain. London: E. & F. N. Spon, Ltd. Pages, 984; illustrated. Price, $7.50.

*La Produccion en Chile de los Metales i Minerales mas Importantes, de las Sales Naturales de Azufre i del Guano, desde la Conquista hasta Fines del Año* 1902. By Alberto Herrmann. Santiago de Chile; published for the Author; Pages, 88.

## BOOKS REVIEWED.

*United States Geological Survey. Contributions to Economic Geology.* 1903. S. F. Emmons and C. W. Hayes, Geologists in Charge. Washington, 1904: Government Printing Office. Pages, 527; illustrated.

This is the second installment of the series of bulletins prepared under the direction of the United States Geological Survey, and issued annually. As has already been noted in

these columns, the purpose of the volumes is to secure prompt publication of the principal results obtained each year by the economic branch of the Survey and to present the information in more succinct form than the final reports issued later on. There is no doubt that in carrying out this plan the Survey can accomplish a great deal toward advancing the mining interests of the country. The present volume includes a large number of papers relating to the important ores and minerals, many of which have been abstracted or noticed in this JOURNAL.

---

*Cyaniding Gold and Silver Ores.* By H. Forbes Julian and Edgar Smart. London: Chas. Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Company. Price, $6.

This is another of the series of excellent text-books published by Griffin; it is one of the best. Of books on cyanidation there is now a respectable array, but the growth of the process and its adaptation to new conditions will continue, for some time to come, to justify the preparation of treatises dealing with its various developments. In the literature of this subject Julian and Smart's book will take the honored place occupied by Henry Louis' book on the kindred subject of stamp-milling; that is to say, it is a clear statement of the theories governing the principles of a metallurgical process.

The examples of plant are rather antiquated, with the exception of the Blaisdell excavator, and the authors depend rather too exclusively upon African practice for their illustrations. Thus filter-pressing, which plays so important a part in Western Australia, is but briefly referred to; and roasting, which, outside of Africa, is also a large factor, is dismissed in ten lines. The figures of costs, to which two chapters are devoted, are mostly old and from oft-quoted sources; indeed a volume requiring such careful preparation is almost sure to be belated in matters of this kind, wherein new records are made from month to month. Those given in this book are already matters of history, and of little value as practical guides to the cyaniders of to-day. On the other hand, in such chapters as those treating of the dissolution and precipitation of the precious metals, the physics of percolation and leaching, and other fundamental matters, the authors give their views with a thoroughness which affords ample evidence of original work of a high order. Besides being an excellent exposition of principles, the book also affords accurately worked out bases and details of equipment such as are to be found nowhere else so satisfactorily. It fits into that part of the subject not covered by Alfred James' 'Cyanide Practice,' the latter being an up-to-date treatment of current practice, just as this is a timely account of theoretical principles; the two books will supplement each other admirably.

The authors fall into one practice which is objectionable, and especially regrettable in a book of reference, that is, the habit of quoting from the abstracts or reprints of an article appearing in the technical press, instead of going direct to the original as it appears in the transactions of the societies before which the article was read. It is not scholarly to refer to a copy, when the original is so easily available, for it creates a source of unnecessary error.

However, apart from these small blemishes, this is a most valuable contribution to the literature of an important metallurgical process, and it will rank as the best text-book on the subject. It is the joint work of a disguished and very able chemist and an experienced metallurgical engineer, so that it escapes the academic taint and will appeal to the man at work in the mill. To him it will be of great interest and no less immediate service.

The present edition covers 400 pages, octavo; it contains plenty of diagrams and illustrations scattered through the text, besides numerous inserts giving drawings, to scale, of cyanide plant and equipment. The printing, paper, and binding are up to the usual high standard of the Griffin series.

---

## CORRESPONDENCE.

**We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.**

**Letters should be addressed to the Editor.**

**We do not hold ourselves responsible for the opinions expressed by correspondents.**

---

### *Origin of Placer Gold in California.*

Sir.—I notice that in an article in the JOURNAL for April 20th, your special correspondent in San Francisco says: "Miners have hunted for the same sort of thing in hundreds of other places above rich placer fields, without finding any original source. In fact, around the richest placers in this State, nobody has ever been able to trace the source whence the gold came."

This statement seems to me rather misleading. If your correspondent will follow the line indicated below I think that I can show him his mistake. In El Dorado county, Oregon cañon and Cañon creek, were among the richest placers in California. The belt of seams in clay slates, known as the Georgia Slide mine and its extensions, crosses Cañon creek and the head of Oregon cañon. This cañon was rich all the way up, and is said to have produced $2,500,000, while Cañon creek, up to the point where this belt crosses it, produced $2,000,000. The Georgia Slide mine was worked by the open-cut method and by ground sluicing, and produced some $3,000,000 from the quartz seams. The Old Drift mines, of Mamaluke Hill, were without doubt supplied from the same source, as this belt of seams crosses at the upper end of the hill, and was there partially covered by lava. Mamaluke Hill produced in all about $3,500,000. Above the point where the seams cross Cañon creek, some placer gold was found on the creek, but nothing like the quantity taken out below. Again, on John Town creek there can be seen a number of places where rich pockets have been worked out; also in Crane's gulch on Greenwood creek, in the same county. Similar places can also be seen in Placer, Calaveras and Butte counties. The Golden Summit mine was at one time a rich drift mine, and is now a quartz mine.

There is one reason, perhaps, why no payable sources of placer gold have been found in many places. If we consider the fact that probably 2,000 ft. of the slates have been cut away by disintegration and decomposition, we can readily see that the values have been concentrated on the present bed-rock, making a rich placer. The prospector goes down, perhaps 10 ft. in a few places above one of these placers, but does not find any rich ledge. Under the circumstances this does not seem strange.

In Alaska, I found prospectors hunting for ledges because there were rich placers below. There were plenty of quartz stringers in a schist formation, which were, in all probability, the source of the placer gold, but none of them were rich enough to work at this time. The extreme temperatures of 75° below zero in winter, and 125° above in summer, have caused the rocks in that country to break up very rapidly, so that a good many hundred feet of the original ledges are concentrated in the present gravel beds. I know of one small pocket of rich quartz, which was found in 1902 on Chicken creek, a tributary of the South Fork of Forty-mile creek. I think there is no doubt that others will be found. However, prospecting is no fun in that country, and it will take time to find quartz mines there.

W. E. THORNE.

Denver, Colo., May 3, 1904.

---

### *The Science of Burning Liquid Fuel.*

Sir.—The application of liquid fuel in various services has now reached a point where no reasonable mind can depreciate its superior value. If there are any failures in the use of this fuel, they are not the fault of the fuel itself, but are caused either by improper equipment or by incompetent handling. With proper modern equipment smoke is eliminated in marine, locomotive and stationary service and economy in fuel is effected.

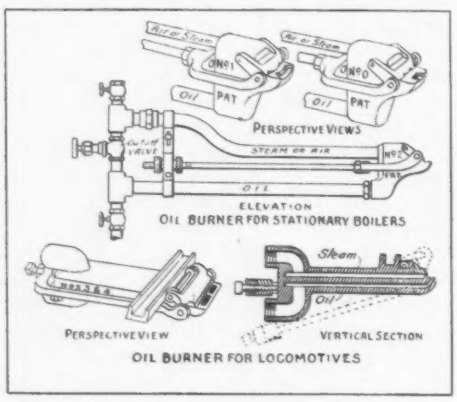
One pound of coke contains 13,500 B. T. U., while a pound of Beaumont (Texas) oil contains 19,060 B. T. U. and California oil contains 20,680 B. T. U. Some Russian oils contain as many as 22,027 B. T. U. per pound. One ton of coke contains 27,000,000 B. T. U., while 4.5 barrels (42 gal. each) of Beaumont oil contain 27,017,550 B. T. U. and 4.2 barrels of California oil contain 27,359,640 B. T. U. Oil furnaces can be so constructed and equipped that there is almost perfect combustion. A small oil furnace of proper modern construction and equipment will produce a daily output equal to that of five forges and of far superior quality.

To obtain the best results from liquid fuel, a furnace should be so equipped that when the doors are opened, for charging or drawing the charge, the interior is as free from all appearances of flame as an arc-light, and of about the same brilliancy. There is a wide difference between a furnace filled with an incandescent heat and one filled with a red flame, from the standpoint of efficiency and economy.

The main points in any method of burning liquid fuel are the admission of just sufficient air at the proper time and place to effect perfect combustion and the thorough atomization of the oil. The latter cannot be accomplished by two pieces of pipe or any other type of burner of such construction that every drop of the oil is not dashed into molecules. The oil must be thoroughly broken up, in order to allow the oxygen of the air to freely mingle with the volatile gases. A burner that simply pours the oil out upon a sheet of steam or compressed air cannot give the desired results. Furthermore, if the oil is above the atomizer slot, when the fire is cut low, the oil will drip and soon solidify, or carbonize, over the atomizer slot. As all crude oil is of either asphaltum or paraffine base, internal combustion burn-

ers always carbonize and are a source of annoyance. A hydro-carbon burner should atomize the oil outside the furnace and have the atomizer slot above the oil cavity, which prevents the oil carbonizing over the atomizer slot. Such a construction is shown in the accompanying cut. In this burner, as the oil channel turns upwardly, the flow of oil must cross the stream of compressed air used as atomizer, and in so doing it is thoroughly atomized and forced over the nose of the burner. The atomizer lip can be raised by means of a bridle, so that any foreign substance, such as red lead, pipe scale, etc., which may get into the pipe while the burner is being installed, can be easily blown out without removing the burner. The atomizer slot being above the oil channel, this burner cannot carbonize. The atomizer lip can be so filed as to produce any width of flame desired. A burner may either have a very long narrow flame, or can be so filled as to make a fan-shaped blaze 8.5 ft. in width, according as the various requirements may demand.

The most severe test to which any burner can be put is furnace practice, for this demands perfect combustion and the even distribution of a high degree of heat. If we visit a plant having a blacksmith's heating furnace,




of either large or small proportions, equipped with a modern scientific burner, the furnace having no smokestack, we find combustion so perfect that, when the furnace doors are opened, no flame is visible, only a white heat of about 3,000° F. As the heat is evenly distributed, there is very little furnace loss. The metal is perfectly welded and free from seams, as there is no corrosion. On the other hand, if we remove this burner from the furnace, and in its stead use a pipe burner, we will note imperfect atomization of the oil and its results: Smoke, or a red flame, fills the furnace, and its output is decreased; the welds are imperfect, as can be seen by the numerous seams; the furnace loss is excessive and the increased consumption of oil is marked. It is a simple method of test, and any doubter can easily make the test himself or visit shops where the outputs can be contrasted.

In some plants it is considered economy to make a burner from two pieces of pipe, in the same old way as those used in crude plants throughout Russia and the United States in the past.

If this type of burner does not smoke, investigation will reveal the fact that fully twice the amount of air necessary, if a modern scientific burner were used, is being admitted to the fire-box. There is a vast difference between burning at oil and burning oil. The first cost of a burner does not indicate economy; only actual test can reveal its true merits, especially when using low gravity oil (12 to 16 gravity).

The adoption of crude oil as fuel has many advantages. Thus, crucibles for melting brass are now giving place to a more modern idea, that of a rotary melting oil furnace, which both improves the quality of the metal and increases the output at less expense and with greater ease. Soon every up-to-date blacksmith shop throughout the country will be using liquid fuel, regardless of the price of oil, because of the superior quality and quantity of output produced by its use.

W. N. BEST.

Los Angeles, Cal., April 30, 1904.

## ABSTRACTS OF OFFICIAL REPORTS.

*Sloss-Sheffield Steel & Iron Company.*

This company owns extensive coal and iron ore properties in Alabama, with seven blast furnaces. Its report is for the year ending November 30, 1903. The capital account includes $6,700,000 preferred stock, $7,500,000 common stock and $4,000,000 bonds. Of the bonds $2,000,000 bear 6 per cent interest and the remainder 4.5 per cent.

The income account for the year is as follows; the net earnings showing profits remaining after deducting working expenses, depreciation, charges on coal and iron lands, and a charge of 25c. a ton on all pig iron made, to provide for repairs and renewals:

| | |
|---|---|
| Profit on pig iron sold | $1,139,147 |
| Profit on coal | 216,265 |
| Profit on coke | 175,961 |
| Ore and dolomite sold | 64,343 |
| Rents, royalties, stores, etc | 208,939 |
| Two-third earnings of N. Alabama Furnace Company | 58,388 |
| Total profits | $1,863,043 |
| General expenses and taxes | $67,402 |
| Interest on bonds | 210,000 |
| Total charges | $277,402 |
| Surplus | $1,385,641 |

From this surplus, dividends of 7 per cent on preferred stock, amounting to $469,000, were paid, leaving a balance of $1,116,641. The balance carried over from 1902 was $1,199,121, making a total surplus of $2,315,762 at the close of the year.

Production from the company's properties was as follows:

| | 1902. | 1903. | Changes. |
|---|---|---|---|
| Coal mined | 1,287,826 | 1,501,956 | I. 214,130 |
| Coke made | 453,054 | 549,201 | I. 96,147 |
| Brown ore mined | 298,700 | 260,539 | D. 38,161 |
| Red ore mined | 284,482 | 377,080 | I. 92,598 |
| Dolomite flux | 101,069 | 115,635 | I. 14,566 |
| Pig iron made | 287,685 | 311,093 | I. 23,808 |

The average price realized for pig iron in 1903 was $13.66 per ton, against $12.25 in 1902; an increase of $1.41 per ton. The average profit realized last year was $3.66 per ton, against $3.24 in 1902, showing an increase of $0.42 per ton. The deliveries of iron in 1903 were 83,633 tons less than the production, which lessened the profits, as they are computed only on iron sold.

During the year Philadelphia and Hattie Ensley furnaces were rebuilt and their capacity increased. The iron ore mines have been kept in good condition. There was some delay at the Russellville mines on account of short supply of water for the ore-washers. The company built 200 new coke ovens. The report says:

"The output of coal increased 17 per cent, following an increase in the previous year of 24 per cent; notwithstanding the closing down of all of the mines in Jefferson county during the entire month of July, owing to the stoppage of work by the members of the United Mine Workers' organization, pending a settlement of the wage scale. In August some of the differences between the coal operators and the miners' organization were submitted to a board of arbitration, presided over by Judge George Gray. By the award of this Board no contention of the operators was granted, while the miners were given a two weeks' pay day, a ruling against the transferability of time checks, and an advance of 2.5 cents on the minimum and maximum for cutting coal, with a corresponding advance in day labor, the highest rate ever fixed for mining in the district.

"In April last a clear title to the Lady Ensley property, which had been in litigation for over nine years, was vested in this company by the court. The company, having from time to time purchased all of the liabilities of the corporation, consisting of $2,000,000 of mortgage bonds, $2,000,000 of stock, and a large amount of judgments, bought the property at the foreclosure sale. The property consists of 16,000 acres of brown ore lands, partially developed, with ore washers, steam shovels, etc., and 14,000 acres of coal lands, a large proportion of it carrying the big seam, 7 ft. in thickness, with a going mine on it, having a capacity of 1,000 tons a day, a coal washer, miners' houses, and 200 coke ovens.

"The Lady Ensley property was acquired at a cost of $620,612, which could have been done only by the purchases of the liabilities from time to time at greatly depreciated prices while the company was in litigation. It was paid for out of earnings, and no securities were issued. The property is conservatively estimated to be worth at least $2,000,000. Until legal possession of the property was had, it did not appear in the statement of property account, as it was held in the name of a trustee, but the trustee account has now been closed, and property account charged with the exact amount which was paid in cash in the acquisition of the property.

"We paid out for real estate (not including the Lady Ensley property), repairs to furnaces, and improveemnts at the mines, $425,893 during the year."

## QUESTIONS AND ANSWERS.

**Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.**

*Electrolytic Production of Zinc.*—Can you inform me whether electrolytic production of zinc from an oxidized zinc ore has ever been accomplished in a commercial way by employing a mixture of oxidized zinc ores with carbonaceous material and passing the heavy electric current through this mixture to produce both fusion and distillation?—O. H. F.

*Answer.*—Commercially, no; experimentally, yes. Numerous patents on such a process have been taken out. Two of the more recent are De Lavel's and Dorsemagen's. A process of this nature involves various factors, chief of which is the question if the requisite heat can

e obtained more cheaply through electrical gency than by the direct combustion of coal. onstruction of the furnace to resist the corsion of slag and removal of the slag are also nportant considerations.

*Muslin for Zinc Collectors.*—Can you tell me he proper muslin to use for a bag-room colecting zinc oxide; also, where it can be procured?—J. W. B.

*Answer.*—Use muslin weighing 3.5 to 6.5 oz. per sq. yd., costing 4 to 7c. The cloth should be 62-in. wide, so that, when sewed up with one lap and two rows of double lock-stitch seams (using Barbour's No. 50 linen thread), the edges of the cloth being turned over so that the threads passes through four thicknesses, the bag will be 18.5 to 19 in. in diameter.

*Fire-clay and Kaolin as Minerals.*—Can you inform me how fire-clay and kaolin are classified, if they are considered as minerals and are subject to the mineral laws and reservations?—F. T. L.

*Answer.*—Under the United States mining and land laws, kaolin and fire-clay are considered minerals. Deposits of these materials, situated on Government lands, can be located and patented as mineral deposits. The method of location will differ, according to the nature of the deposits. If in vertical or inclined seams, they would have to be located as veins or lodes; if in flat beds, or masses, they would come under the head of placers. The geologic conditions rule in such cases, rather than the nature of the mineral.

*Tin Smelting.*—Please let me know if there are any reduction works for tin ores in the United States; and if so what a dressed ore may contain to be saleable.—L. D.

*Answer.*—There are no reduction works for tin ores in operation in the United States. A company, called the International Tin Company, some time ago built a furnace at Bayonne, N. J., intending to run on imported tin ores. It was found that, owing to the export duty on ores in the Straits Settlements, this could not be done at a profit, and the enterprise was abandoned.

The only pig tin made in this country is by the Vulcan De-tinning Company, of New York, which has a plant at Sewaren, N. J., where tin is recovered from tin-plate waste and scrap. No ore is reduced there.

*Halloysite.*—Can you tell me what halloysite is, and where it is found? I should like also to know its uses and composition.—N. McD.

*Answer.*—According to Merrill's 'Non-metallic Minerals,' halloysite is a white or yellowish clayey material, very much like kaolin in appearance, but occurring in indurated masses. It has a greasy feel and luster, and adheres strongly to the tongue, a property due to its capacity for absorbing moisture. This property is characteristic of many clay compounds. A typical analysis of halloysite showed: Silica, 42.9; alumina, 38.4; lime, 0.6; magnesia, 1.5; water, 18.0. A trace of iron oxide is often present. It is very similar to kaolin, and can be used for the same purposes, in the manufacture of chinaware and the like. Halloysite has been found in Murphrees valley, in Alabama; near Stone mountain, in Georgia; in Edwards county, in Texas; in Mono county, in California, and in Indiana. It occurs usually in small quantities.

## RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

LIABILITY FOR DAMAGES AT SURFACE FROM UNDERGROUND WORKINGS.—The person owning the minerals is bound at his peril to not cause a subsidence of the surface, even though he cannot work his mines at all without so doing, and no degree of care or skill exercised in mining operations will shield him from liability to the owner of the surface for all damages sustained by reason of any subsidence thereof. A custom, as between the owner of the surface and the owner of the mines, entitling the owner of the mines to cause a subsidence of the surface if necessary to the working of the mines, will not be operative to shield the mine owner from liability, and such custom has been held bad and wholly void.—Mitchell v. Big Six Development Company; United States Court, Western District of Missouri.

## PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

*Week Ending May 3, 1904.*

758,608. COMBINED BUCKET AND SUCTION DREDGE.—Robert Andrew, Melbourne, Victoria, Australia. In a combined and suction dredge the spring-cushioned nozzle formed with a hemispherical flange, combined with a spherical cap, a socket-piece and a spring.

758,624. PEAT-HARVESTING MACHINE.—Alexander Dobson, Beaverton, Canada. In a peat-harvesting machine, the combination with the wagon and frame, of a swinging frame pivoted on the top of the wagon, and peat-cutting means depending from one end of such frame.

758,655. MAGNETIC ORE-SEPARATOR.—William L. Imlay, Philadelphia, Pa., assignor to Adolph Segal, Philadelphia, Pa. A magnetic ore-separating apparatus consisting of a rotating drum containing a magnet, said magnet having a hub carrying two sets of segments forming a drum and wire wound on said drum, certain of the segments being of magnetic material and forming the pole-pieces of the magnet and the others being of non-magnetic material and serving to retain the wire in position.

758,658. COMPOUND FOR COATING BRICKS, PLASTERING, ETC.—Charles Jacobs, New York, N. Y. A composition of matter for coating bricks, consisting of the compounds formed by mixing caustic soda, acids and sugar of lead mixed with oil.

758,660. APPARATUS FOR MAKING CASTINGS.—William T. James, Chicago, Ill. In casting apparatus the combination with a pair of movable circular racks and means for moving the same, of a series of reversible molds mounted upon said racks, resting upon pinions on said racks, and means for inverting said molds by rolling them on said pinions.

758,661. CONVEYOR-BUCKET.—William T. James, Chicago, Ill. A conveyor bucket having sides and a reversible bottom, to form a loading space alternately on one side and the other of the bottom.

758,662. CONVEYOR.—William T. James, Chicago, Ill. A conveyor bucket provided with a body and a rigid forwardly extending bottom approximately twice the length of the sides of the bucket, forming with the next preceding links a closed chamber.

758,687. PIGMENT AND METHOD OF PRODUCING IT FROM FERROUS LIQUORS.—Alexander S. Ramage, Cleveland, Ohio. A method of producing pigments from ferrous-sulphate liquors, which consists in precipitating from the liquor predetermined amounts of basic ferric sulphate and basic ferric hydrate and combining said sulphate and hydrate precipitates.

758,710. TITANOUS COMPOUND AND PROCESS OF MAKING SAME.—Howard Spence, Manchester, England, assignor to Peter Spence & Sons, Limited, Manchester, England. A new compound of titanous sodium sulphate produced from titanium-sulphate compounds by electrolysis, which is of a lilac color, is easily soluble in water, and is a powerful reducing agent.

758,713. LEACHING APPARATUS.—George W. Stead, Philadelphia, Pa. The combination of a pan having the outwardly inclined forward end, a series of hinged scrapers extending adjacent to the bottom of the pan and adapted to swing forwardly and means for stopping the same from swinging backwardly, a support to which said scrapers are hinged, and means for reciprocating said support.

758,735. CRUSHER.—James W. Boileau, Detroit, Mich., assignor to Louis C. Sherwood, Detroit, Mich. An ore-crusher comprising a pair of rock-shafts connected for synchronous movement, a crushing-plate, a strut, one end of the plate and strut pivotally abutting, and the opposite ends pivotally engaging bearings upon said rock-shafts whereby said plate may be reciprocated, a co-operating stationary plate arranged at an angle to said movable plate to form a wedge-shaped chamber there-between, and a cam in rear and intermediate the pivotal bearings of said reciprocating plate adapted to cause a lateral deflection thereof during the longitudinal movement.

758,746. MIXER.—John F. Gandolfo, Dubuque, Iowa. In a mixer, operating means, and mixing-blades pivotally connected therewith and free to swing during the operation of the mixer, said blades being arranged to travel in a rotary direction and in an approximately horizontal plane.

758,761. CLUTCH-HEAD FOR ROCK-DRILLS.—John E. Littleton, North Tarrytown, N. Y., assignor of one-half to William F. Leary, North Tarrytown, N. Y. A drill-shaft for drilling-machines provided with a cylindrical head having a central longitudinal recess therein the inner end of which is conical in form, a sleeve inserted in the outer end of said recess and the inner surface of which is conical internally at its inner end, a clutch member circular in cross-section and tapered at both ends and composed of a plurality of longitudinal parts and held in said head by said sleeve, and a cap adapted to be screwed on said head and to force said sleeve thereinto.

758,774. PROCESS OF MANUFACTURING NITRIC DIOXIDE AND NITRIC ACID.—Guido Pauling, Olbernhau, Germany. A process of manufacturing nitric dioxide and nitric acid, consisting in heating a mixture of air and steam until the water has attained a considerable degree of dissociation, removing the dissociated hydrogen through the pores of an incandescent tube, and combining with the same chlorine.

758,775. APPARATUS FOR THE TREATMENT OF GASES.—Harry Pauling, Gelsenkirchen, Germany. An apparatus for the treatment of gases, vapors and the like by electric spark discharges, comprising a funnel-shaped electrode, another electrode of shaft form rotarily mounted in suitable bearings, one end of said electrode being covered with insulated material and projecting into the open end of the funnel-shaped electrode, a laterally-directed projection arranged on this end of the shaft and projecting through the insulating material, means for rotating the shaft-electrode, means for sucking air through the funnel and electric connection between the electrodes and a source of electricity.

758,801. CONDENSING AIR-PUMP.—Johannes Wilhelmi, Hamburg, Germany. A pump having a water-cylinder and an air-cylinder larger than the water-cylinder, pistons therein, a piston-rod connected to both pistons and means to produce an air-cushion at the termination of the downstroke, whereby the space between the large and small pistons in the air-cylinder causes by its vacuum action a compensation or balance of work between the two halves of a double stroke (up and down stroke).

758,809. CHUTE.—Charles K. Baldwin, New York, N. Y., assignor to the Robins Conveying Belt Company. In a chute, the combination of a folding delivery-apron, and a pivotally mounted gate or stop arranged in the chute and operatively connected to be positively actuated to open and close by the movements of the apron.

758,810. TRIPPER OR DELIVERER FOR CONVEYING APPARATUS.—Clarence K. Baldwin and Frank E. Ticknor, New York, N. Y., assignors to

the Robins Conveying Belt Company, New York, N. Y. A tripper or deliverer for a conveying-belt provided with constantly-rotating idler-pulleys over which the belt runs, and means actuated by one of said idler-pulleys for giving travel to the tripper in either direction at will from the same pulley.

758,812. SLAG-CAR.—Benjamin H. Bennetts and Llewellyn J. W. Jones, Tacoma, Wash. In a slag-car, the combination with a truck, of a slag-pot mounted on said truck and adapted to dump the slag in a solid mass in any direction from said truck, a hook pivoted to said slag-pot and adapted to engage said truck whereby said pot is prevented from turning on said truck and from tipping thereon, and a handle engaging the rear end of said slag-pot and bent so that when said pot is down said car may be pushed by said handle and when it is tipped up said handle may be within reach whereby the dumping of the slag may be controlled.

758,844. PROCESS OF MAKING SULPHURIC ANHYDRIDE.—George Lunge, Zürich, Switzerland, and George P. Pollitt, Stanford le Hope, England, assignors to Verein Chemischer Fabriken in Mannheim, Mannheim, Germany. A process of manufacturing sulphuric anhydride which consists in adding a sufficient amount of substance containing arsenic to a metallic oxide to form a contact substance containing throughout a greater percentage of arsenic than fresh-burnt ore, and passing gases derived from ore-roasting over said substance.

758,853. METHOD OF CONVERTING IRON-SAND INTO BRIQUETTES OR LUMPS.—Thomas Rouse, Stamford Hill, England, assignor of one-half to Herrmann Cohn, London, England. A process of agglomerating by means of solution of water-glass and hardening into lumps or hard blocks, iron-sand, powdered iron ore or blue-billy or the like, or mixtures thereof, by means of a mixture of hot air and steam at atmospheric pressure in a ventilated chamber, in which condensation of the steam into a deposit of water of condensation is prevented by regulating the supply of hot air and steam and the ventilation.

758,875. TRIPPER OR DELIVERER FOR CONVEYING APPARATUS.—Frank E. Ticknor and Clarence K. Baldwin, New York, N. Y., assignors to Robins Conveying Belt Company, New York, N. Y. In a tripper or deliverer for conveyors, the combination with the frame and wheels, of a continuous traveling conveyor-belt and a plurality of pulleys for the belt, a worm-shaft connected to drive the wheels of the tripper, and clutch mechanism interposed between one of the idler-pulleys and said shaft, for driving said shaft in either direction.

758,893. COAL-BUCKET RELEASE.—Alfred R. Bissett, Vancouver, Canada. In an automatic lock-release for a tipping hoisting-bucket; the combination with the hinged lock by which the bucket is prevented from tipping, of an operating-pin slidable endwise in the lock in a line toward its hinge, a lever pivoted to a part of the hoisting-tackle adjacent to the hook and depending against a spring-check, a flexible connection between the outer end of said lever and the slidable pin of the lock, and a ring adjustably secured to the gaff or derrick from which the hoisting-tackle is suspended.

758,915. PICK.—Joseph Hartshorn, Stuart, Iowa. A pick having a longitudinal mortise, and a bolt-opening communicating with said mortise and extending through the body of the pick, a ferrule having a longitudinal tenon, a socket extending entirely through the ferrule and having a groove communicating with said socket and extending to the end of the ferrule, a bolt having a square head adapted to fit in the socket; and the nut adapted to be screwed upon the threaded end of the bolt.

758,926. DRILL-SHARPENER.—David G. Morgan, Chinese, Cal. The combination in a machine for sharpening hollow drills, of expansible reciprocable dies, jaws for adjustably holding a hollow drill with its bits in opposition to the dies, whereby all the bits may be sharpened simultaneously, a mandrel in axial alinement with the drill, and jaw series and means for actuating the dies.

758,931. VALVE ACTUATING MECHANISM FOR BLOWING-ENGINES.—Gustav B. Petsche, Philadelphia, Pa., assignor to the Southwark Foundry and Machine Company, Philadelphia, Pa. In a blowing-engine having admission and delivery valves of the sliding-gridiron type at both ends of the compressing-cylinder and all moving in planes parallel to each other and transverse to the axis of the cylinder, the combination of oscillating cams arranged to move the admission-valves in both directions and in a positive relation to the moving parts of the engine, another set of oscillating cams arranged to move the delivery-valves in the direction to close them but not to open said valves, resilient, intermittently-acting means acting to open the delivery-valves, a rock-shaft situated in a plane lying between the ends of the cylinder and running transversely to the lines of movement of the valves, oppositely-extending lever-arms secured to the rock-shaft, rods connecting said lever-arms with the cams of the admission-valves, another set of oppositely-extending lever-arms secured to the rock-shaft, rods connecting said arms with the cams of the delivery-valves, and means for communicating motion to the rock-shaft from a positively-moving part of the engine.

759,016. CHARGING-SCALE.—Robert W. Romig, Pittsburg, Pa., assignor to E. & T. Fairbanks & Company, St. Johnsbury, Vt. A charging-scale having a single beam and a poise sliding thereon, blocks adjustable longitudinally of the said beam and adapted to be engaged by said poise, said beam being provided with suitable graduations arranged to register with the blocks.

759,100. AIR OR GAS LIFT FOR FLUIDS.—Walter B. Harris, Indianapolis, Ind. An air or gas lift for fluids including an air-tight casing, a delivery-tube extending downward in the casing with an inlet at its lower end, a pipe within the casing extending parallel with said delivery-tube through which compressed air or gas may be conveyed, ejectors leading at intervals from said air or gas pipe to said delivery-tube, and means for introducing compressed air into the casing upon the body of fluid.

759,108. APPARATUS FOR EXCAVATING AND SLUICING GRAVEL OR OTHER MATERIAL.—Frank K. Hoover and Arthur J. Mason, Kansas City, Mo. In an apparatus of the character described, the combination with a suitable platform, of a boom swinging thereon on rockers, an excavator suspended from said boom, and actuating devices for said excavator which by a continued movement first raise the excavator and subsequently move it, with the boom, inwardly over the platform in substantially the vertical plane of the boom's movement.

759,145. PUMP.—Perry M. Wing, Boyd, Ore., assignor, by direct and mesne assignments, to Walter H. Carlisle, P. B. Stephens, J. S. Schatz, and William Harper, The Dalles, Ore. A pump comprising a pair of T's having upwardly-extending lugs, supply and exhaust pipes connected with said T's and including check-valves, a suction-pipe connected by a T with the supply-piping, a discharge-pipe connected by a T with the exhaust-piping, unions connecting the members of the supply and exhaust pipings whereby the frame including the latter may be readily disassembled, cylinders connected with the T's having the uwardly-extending lugs, a reciprocatory plunger engaging said cyinders and having an upwardly-extending lug, and an operating-rod engaging said lug and extending through bearings in the lugs extending upwardly from the T's.

759,153. CONCENTRATING AND AMALGAMATING MACHINE.—Francis J. Bonnington, San Francisco, Cal. A tray for concentrators and amalgamators comprising a series of level horizontal steps arranged one after the other in progressively lower planes, combs having depending teeth arranged over said steps transverse the tray, and combs arranged in line with the edges of said steps and having their teeth extending below the plane of said steps and bent to overlap the same.

759,158. HYDRAULIC AIR-COMPRESSOR.—William G. Cox, New York, N. Y. In hydraulic air-compressors, a body-section provided with an inlet for liquid and having an air-delivery valve at its upper portion, a tubular guide within the body-section for admitting air to the same, the said guide being in communication with the outside atmosphere and unobstructed throughout its length, a bonnet-valve normally closing the inner end of the tubular guide, a water-outlet for the said body-section, a lever-controlled valve for the said outlet, an auxiliary tube on the guide and forming a connection between the lever-controlled valve and the bonnet-valve, to move the lever-controlled valve on the final upward movement of the bonnet-valve, and a float mounted to slide upon the said auxiliary tube, which float upon its upward movement first raises the bonnet-valve to uncover the tubular guide, and next further raises the bonnet-valve to move the lever-controlled valve to uncover the water-outlet opening in the body of the device.

759,191. PROCESS OF TREATING COPPER ORES.—Charles H. Rider, St. Louis, Mo. A process of extracting copper from its ores comprising the following steps: Crushing the ore, charging a series of connected receptacles therewith, adding thereto a solvent comprising sodium chloride, nitric acid and water, closing said receptacles, and permitting the gases generated therein to circulate through the said several receptacles and through a second series of receptacles, connected thereto, containing water, removing the water from the second series and charging the same with the metal impregnated fluid from the first series of receptacles and precipitating the copper therein.

759,192. PROCESS OF TREATING LEAD-BEARING ORES. Charles H. Rider, St. Louis, Mo. A process of manufacturing white lead from lead ores, comprising the following steps: Crushing the ore, charging a series of receptacles with said crushed ore, adding thereto a suitable solvent, in liquid form, causing circulation of the gases generated thereby through said series of receptacles, removing the solution thus produced to a second series of receptacles, adding a precipitating reagent, recharging the first series of receptacles with ore and solvent fluid, and coupling the two series of receptacles to cause gases generated in the first series to circulate through the second series.

759,201. HOISTING APPARATUS.—Harrison D. Stratton, Philadelphia, Pa. An electric hoist comprising a motor, a drum operatively connected to said motor, a switch, a brake, mechanically-actuated means for forcing said brake into its operative position, means for preventing the operation of said brake-forcing means and means connected with said switch for holding said preventing means in operative position.

759,220. METHOD OF TREATING COPPER-BEARING ORES WITH CYANIDE SOLUTIONS.—Lewis E. Porter, Los Angeles, Cal., assignor of one-half to John J. Seeman, Barstow, Cal. The process of treating copper ores which consists in, first, subjecting the ore to the action of alkaline cyanide solution and thereby dissolving the metals which are soluble in said solution; second, treating the solution with acid and thereby producing copper cyanide precipitate and hydrocyanic-acid solution; third, separating the solution containing the hydrocyanic acid from the copper precipitate; fourth, neutralizing said hydrocyanic-acid solution with alkaline oxide thereby reproducing alkaline cyanide solution for repetition of the before-described process; and fifth, producing metallic copper, from the copper cyanide precipitate by placing the copper precipitate in a suitable receptacle together with an alkaline solution and treating the mixture by electrolysis and thereby producing metallic copper and alkaline cyanide solution.

## GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

*Week Ending April 16, 1904.*

6,099 of 1903. DESULPHURIZING GASES.—E. Burschell, Pfaltz, Germany. Extracting sulphur from illuminating and heating gases in one operation, by passing the gases through a solution or a mixture of cupric and ferrous salt.

10,388 of 1903. MINER'S LAMP.—W. Sedgwick and J. F. Smith, Castleford. Improved means of electrically lighting miners' safety oil lamps.

11,000 of 1903. CRUCIBLE.—A. Reynolds, London. Electric crucibles made with surrounding walls containing material of high electrical resistance, so as to more effectively distribute the heat.

11,001 of 1903. CRUCIBLE FURNACE.—A. Reynolds, London. An electric crucible furnace in which the lining acts as the anode, and the current leaves from a centrally placed cathode.

11,002 of 1903. STEEL MELTING.—A. Reynolds, London. In melting steel, providing a slag to float on it, and heating the slag by means of electric arcs.

11,229 of 1903. COUPLING FOR MINE CARS.—J. Pughsley, Glamorgan. A device for preventing the shackle-pins of miners' trams being jerked out of position.

11,440 of 1903. EXPLOSIVE.—W. J. Orsman, Wigan. A safety explosive for mines composed of 10 per cent. of powdered aluminum and 90 per cent. of nitrates.

26,261 of 1903. LIGHTING MINERS' LAMPS.—A. Wiedenfeld, Bochum, Germany. Improved electric igniter for miners' safety lamps.

## SPECIAL CORRESPONDENCE.

**Denver.** May 7.

*(From Our Special Correspondent.)*

There is a chance of Colorado having an independent refinery added to its industries before long. It is undecided yet where it will be established, but experts are here at present looking over the situation.

The construction of the Denver Mint building is progressing; it is now expected that operations will commence there in about a year.

The second survey, which has just been made, of the Cripple Creek district, under the direction of Mr. Waldemar Lindgren, was completed a few days ago, and that gentleman has also inspected the metallurgical plants, treating the ores from the district with a view of incorporating their treatment in his report. Part of the expenses of this re-survey was paid by subscription of the mine owners.

The independent smelter of the Ohio-Colorado Smelting & Refining Co., located at Salida, will be enlarged to a capacity of 1,000 tons daily, and two new lead furnaces will be constructed there at once. It is also rumored that this company will operate a smelter for low-grade ores at Leadville.

The hydrographic branch of the United States Geological Survey has resumed active operations at the gauging stations of the rivers in this State during the past week; this work will be in charge of M. C. Hinderlider, who will make his headquarters at Denver.

In my correspondence of April 16 I referred to the fact that our Chamber of Commerce and Board of Trade had invited the American Mining Congress to establish its headquarters in this city. David H. Moffat, of Denver; Col. Thomas Ewing, of California, and J. R. Leonard, of Pittsburg, Pa., were apointed a committee to consider the most suitable and available locality for the same; to ascertain the cost of a suitable site and building, and of equipping the same. They are requested to report at the August session of the Congress.

---

**Duluth, Minn.** May 6.

*(From Our Special Correspondent.)*

An exceptional interest is now taken in the possible iron ore fields of western Ontario, where considerable exploration has been carried on for the past year. Those that have explored the Atikokan and other parts of the Algoma country are of the opinion that rich ores lie there, but as yet they have been unable to find anything of value, unless it is possible that the recent finds of the International Iron Co. may be so classed. In spite of newspaper stories, however, their finds are not yet of definite value, though they certainly do look encouraging.

In this Canadian portion of the Lake Superior region ore has been found by drilling in what is called by geologists the Amimikie series, which is really an easterly extension of the Mesabi ore-bearing rocks, even as far east as Loon lake, and at other points east of Thunder bay on Lake Superior. Between Loon lake and northeastern Minnesota various explorations have, in the past winter, and previously, met more or less encouraging results, though but few of them have actually found ore, and possibly none ore in commercial quantities. The iron formation eastward to Loon lake, and probably beyond, is similar to that of the Mesabi, though it is thin, and intruded by igneous rocks that have frequently changed and altered the character of the ores. This change is first noticed on the eastern Mesabi, in the central part of T 59 R 14, where there is a decided change in the character of the rocks. If the ore deposit at Loon lake is of value it will be the first good ore in quantity found between the point referred to on the Mesabi, and the north shore of Lake Superior, a stretch of apparently ore-bearing formation more than 150 miles long. Explorations in a somewhat similar region on the Penokee range, Michigan, failed utterly to finding anything of commercial value.

The work of the International Iron Co., on Hunters Island, and quite near the Minnesota line, has been under way all winter, and with very encouraging indications. A drift has been driven through the jasper and lean ore of a great ridge, and is now in ore of excellent appearance, though as to its quantity there is no knowledge. It is the opinion of the prospectors, certain Duluth, Minn., men, that they have hit upon a discovery of the utmost importance.

In the Atikokan and Mattawan regions, west from Thunder bay, no large amount of explorations has been under way the past winter, and these districts are now, generally speaking, idle. Two or three diamond drills were operated there last summer, and the finds were not as satisfactory as expected. On the Atikokan range there is a vast outcrop of magnetite, rich in iron, very low in phosphorous, and with not as much sulhpur as has been generally reported, that should prove of moment. There are at least 1,000,000 tons shown by some work that has been carried on above the level of the surrounding country, and holes have shown the formation to extend downward. The owners of this property are now at work on a furnace project. They may decide to calcine their ores at the mine, fuel being at hand, or they may find the intermediate process unnecessary, given a suitable mixture. They hope to erect blast furnaces on Lake Superior, and in Canada, in order to take advantage of the bounties there offered for the production of pig iron.

Most of the exploratory work that has been going on recently in northwestern Ontario has been by American companies, usually steel makers, who are looking to the future for additional supplies, and signifies, to a more or less extent, the gradual increase of unproductive explorations on the American side, where the area suitable for exploration and at the disposal of the public, is growing more and more restricted.

---

**San Francisco.** May 4.

*(From Our Special Correspondent.)*

The action of the Amador City Miners' Union at the Fremont Consolidated Mining Co.'s properties at Drytown, in Amador county last week resulted in the discharge of 82 miners and the practical closing down of the mine. Their grievance forms a new one for mine owners here to contend with. It seems half a dozen of the miners at work were behind in their dues to the local union, and one man in particular, who had not paid up his dues, was supposed to be talking against the union, of which he was a member. When the men came on at change of shift they told the manager that some of the miners were behind in their dues to the union, and the others declined to go down the mine to work unless those in arrears paid up their dues or were discharged forthwith. One man refused to pay his back dues under the circumstances, and the rest said they would quit unless he was discharged. The superintendent naturally took the ground that the matter of payment of dues to a union was nothing which he had anything to do with, and declined to interfere. Thereupon 82 men walked out. Manager Arthur Goodall told them they might consider themselves discharged, and they were paid off and quit, though showing no spirit of violence.

This sort of action is in the nature of making a mining company an involuntary agent for the collection of dues to a union to which its employees may belong. Very naturally Mr. Goodall would have nothing to do with the matter. The mine has been operated on the "open-shop" plan, like all other mines in Amador county except one. The highest wages were being paid, but membership of a union was not necessary to obtain employment. There has heretofore been no friction with the employees, though the company has been prepared for a long time to resist any arbitrary demands, preferring to close down rather than submit to dictation of any miners' union. The Goodalls and their associates have spent very large sums in reopening the old Gover, the Fremont and adjoining claims, and in doing extensive development work at the same time, and installing new and costly machinery. The new 40-stamp mill has not been many months in operation, and has not yet had time to half-way reimburse the company for its great expenditures. The mine was the largest employer of labor in the northern part of Amador county. This adds one more to the number of prominent mines in the Mother Lode counties, which have been compelled to stop work owing to trouble with labor unions. In this particular case there was no complaint about wages, treatment, hours, boarding place, recognition of union, or anything of that sort.

The Mother Lode properties around Jackson and Sutter creek are anxious to see a railroad built from Ione to those places and perhaps beyond. A traction outfit now brings the fuel oil, supplies, etc., from the railroad station at Ione. A company has been formed to build an electric road from Ione, but no franchise has yet been applied for. The Kennedy, Oneida, Zeila, Wildman, Central Eureka, South Eureka, and a dozen other mines would be greatly benefited by such a road.

The United States mint at this city has broken another record, after having shown its ability to make a record gold coinage for two months in succession. In April the mint coined the largest number of pieces for one month in its history, most of it being Philippine money. The total for the month was 3,044,000 coins, including standard dollars, pesos, dimes, 50 centavos, 20 centavos and 10 centavos. There is an immense amount of gold now coming from Japan to be coined into American money. Thus far this year over $23,000,000 has come from that country to San Francisco for recoinage.

A piece of land near Stirling, Butte county, is a matter of contention between V. W. Hupp and the Golden Gate Mining Co. The mining company bought the ground from the railroad company as timber land eight years ago. Hupp claimed that it was of more value for minerals and did assessment work on it for several years. This is the third time this piece of land has been before the Land Office for decision as to its character.

The litigation between J. C. Kemp van Ee of the Royal Consolidated mine at Hodson, Calaveras county, and John H. Brotherton, has not been amicably settled after all. Some months since it was represented to the court that an agreement had been reached between the litigants and the case was finally dismissed. Now it seems there is further trouble over this settlement, and Brotherton has taken his case into the United States Circuit Court in this city. He asked for a temporary injunction, a receiver and an accounting, but the application was denied. The trial will not probably be on the equities of the matter.

Chas. A. Smith, of Los Angeles, nas brought suit against J. F. and F. H. Baker for the recovery of $2,500 paid as installment on purchase price of certain mines near Carters, Tuolumne county. These are the Sunnyside, Never Sweat, Hill Top and River View. The purchase price was $30,000, and Smith made a first payment of the amount named and later made several supplementary agreements with the owners and bought one of them out. The complaint states that Smith invested $10,000 more in machinery and improvements. After a while the owners served notice on Smith terminating the agreements, on the ground that he had forfeited his rights by failure to comply with the terms.

There is considerable demand for limestone deposits in this State at present and it seems to be desired to open deposits near the bay or ocean where they can ship by water as well as by rail. This is due to the fact that railroad rates are not what the lime producers are satisfied with. A deposit only 12 miles below the Golden Gate is about to be opened on a large scale, and shipment to San Francisco will be made by steam schooners. Another company has opened a quarry at San Vicente creek, 14 miles up the coast line from Santa Cruz. At that point there is no landing for vessels and the owner, J. Q. Packard, has asked the supervisors of the county for a franchise for a railroad to haul the lime to Santa Cruz, whence it can be shipped either by sea or rail to the metropolis.

Continued and marked interest is being shown in connection with the dredging lands in Yuba county between Marysville and Smartsville, and the Marysville people are beginning to think they will shortly have a mining boom. All along the Yuba and the surrounding foothills acreage is being bonded or purchased by

companies intending to engage in gold dredging. The operations around Oroville have shown the possibilities of the dredge process of mining, between 20 and 30 dredges being now profitably at work. The conditions along the Yuba are similar and meantime the machines have been greatly improved. Smartsville was at one time the seat of extensive hydraulic mining operations, and large quantities of gravel still lie untouched.

The odd thing about this is that Yuba has been for years the leading county in making a fight against mining. The debris from the old hydraulic mines injured the town and surroundings, and the most bitter and uncompromising of the miner's enemies came from that place. Times have changed, however, and the Marysville people now think they are really going to be benefited by mining in their neighborhood. At any rate their citizens are selling dredging land to many outsiders. Whether, when the dredges are started, the land all sold and operations under full swing, they will go back to Anti-Debris Association and try to stop even dredging, remains to be seen.

The River Improvement Convention will soon be held at Sacramento, and a number of public bodies have been invited to attend, including the Anti-Debris Association. It is significant, however, that the California Miners' Association, the largest representative body of them all, has not been invited to send delegates. The writer ventures to predict with some confidence that certain anti-mining resolutions will be adopted at the coming convention and that the matter of gold dredging in particular will receive some attention, not in its favor. There will be no official representatives of the miners present to combat the arguments which will be brought forward by anti-debris men.

---

**Toronto.** May 7.

*(From Our Special Correspondent.)*

The Ontario Bureau of Mines has been informed that the International Iron Co., which has for some time been prospecting for iron ore in the district known as Hunter's Island, north of the boundary line, a few miles from the Vermilion iron range, has discovered a deposit of specular hematite similar to that which occurs in northern Minnesota. The ore is up to bessemer grade. The bureau officials state that the character and indications of the locality are such as to warrant the expectations of obtaining a high quality of ore in that neighborhood. The search has been prosecuted for several years.

A rich strike of ore is reported at the Shakespere gold mine, near Webbwood, Algoma, which was made while sinking a shaft.

Summer mining schools will be held at the principal mining centers of Ontario by the Bureau of Mines to teach the elements of mineralogy and geology. The lecturers, Dr. W. L. Goodwin, of Kingston, ad J. W. Bain, B. A. Sc., will hold classes in ten localities commencing May 2 and terminating August 10.

Mr. T. W. Gibson, Provincial Director of Mines, has received a sample of iron ore found 60 miles north of North Bay, near Rabbit Lake, on the line of the Temiskaming & Northern Ontario Railway, which has the appearance of being a good quality of hematite. It is not as yet ascertained whether it occurs in paying quantities.

Dr. Haanel, Dominion Superintendent of Mines, Ottawa, and chief of the commissioners to investigate the electric process of pig iron and steel manufacture, has just received a consignment of pig iron and castings from Livet, France, and one of steel tools from Gysinge, Sweden. The former include three classes of pig iron and samples of the ore, sand and coke, with which the furnace was charged. The samples of pig iron were taken from the middle of the blocks and illustrate the fact that the electric process is so elastic that white, gray or mottled varieties can be obtained. Some of the castings had been bored through to demonstrate that they were sound and without blow holes. They had sharp edges, and were polished on one side. A broad plate of sheet iron bore a French inscription as follows: "Congratulations to Dr. Haanel and his mission. Cast iron obtained by direct electric reduction of the iron ore process. Keller, foundry at Livet, March, 1904." The steel tools from Sweden comprised lathe tools and cold chisels made from steel, the ore for which was smelted in electric furnaces. These articles have been placed on view in the office of the superintendent of mines, where they have been examined by large numbers of those interested in the development of the industry.

---

**Victoria.** May 3.

*(From Our Special Correspondent.)*

The March returns of the Tyee Copper Co. place the gross value of the 5,117 tons of ore treated, after deducting costs of refining and purchase of customs ore, at $55,565.

A meeting of the creditors of the Lenora company was held in Victoria yesterday to consider a proposal for the sale of the property to an English syndicate. The offer was accepted; but the financial arrangements in London have yet to be completed.

Robert Hamilton of the Wm. Hamilton Manufacturing Co., who is largely interested in dredging on the Fraser river, states that at Lillooet the gravel has been dredged to a depth of 46 ft., values being mostly evenly distributed to this depth, and the ground where the dredge is now working is said to average $1 a yard. Recently 70 miles of the river from Lillooet has been staked and leases applied for. The Fraser River Gold Dredging Co.'s new dredge at Lytton has been completed, while the old dredge is in operation, producing, it is reported, about $400 a day.

An important strike is reported to have been made on the Ottawa, in the Slocan City division. The long cross-cut has reached 2 ft. of high-grade milling ore, while in the No. 4 drift good ore has also been opened up further south.

At the end of March the Kootenay lead mines had earned $121,000 under the lead bounty act.

Crushing operations have been resumed at the Fern mill, at Hall Siding, Ymir, a considerable amount of ore having accumulated at the mine.

At the Ymir mine, last month, 45 stamps were in use, crushing 3,300 tons of ore, which yielded 870 oz. bullion. The total gross value of bullion and concentrates is estimated at $19,280, and the working expenses, $18,400.

In the past the Northport smelter has been compelled to purchase iron ores for fluxing purposes. It is now announced that dependence on outside sources may in future be avoided, during the recent close down of the works experiments having been successfully conducted in mixing ores from the different stopes in the Le Roi mine.

The recent abolition of the duty on oil used in connection with the Elmore process of concentration has resulted in effecting a saving of 12c. per gal., the price formerly charged with the duty added having been 41c., against the present price of 29c. per gal. Meanwhile the White Bear company at Rossland is breaking ground for the foundations of a 100-ton plant. It is announced also that the ores of the Iron Mask mine in the same camp will shortly be tested to ascertain their amenability to this process, and doubtless other mines will follow suit.

The Volcanic Mining & Developing Co., of Marquette, Mich., has secured an extension of two months, from May 1, to July 1, on the bond on the Volcanic group in the Boundary district.

It is announced that the Kamloops, Minnehaha and Sailor mining companies, Camp McKinney, have been consolidated. The properties have been closed down for some two or three years.

---

**Monterey.** May 4.

*(From Our Special Correspondent.)*

Notwithstanding the rumor that the Guggenheim interests have obtained control of the principal mines producing fluxing ores in the vicinity of Chihuahua, so as to shut out an independent smelter, Mr. Enrique C. Creel, president of the largest bank in Chihuahua, continues to gather data as to the best point for such a smelter, and it seems now to be only a question as to whether it shall be located at Parral, Jimenez (the junction point of the Parral branch and the main line of the Mexican Central) or Chihuahua. Mr. C. L. Graves, manager of the Chihuahua & Pacific, has furnished Mr. Creel with a report on freight charges on ores, coal and coke, and a map showing the tributary mining camps. Wm. Dale, a well known miner in the State, has reported on the probable fluxing ores available, and Mr. James W. Malcolmson, of El Paso, is engaged in compiling the data obtained to determine the most advisable situation. Associated with Mr. Creel in this enterprise there are, among others, J. R. Long, Jas. E. Hyslop, G. C. Beckman and Jas. B. Flynn. It is said the Mexican Government will give all the aid it can in the way of exemption from duties, taxes, etc., so that the American Smelting & Refining Co. cannot get too strong a hold on the Republic.

It is now stated most positively, and on fairly good authority, that Mr. H. M. Dieffenbach, who has for so many years been connected with, or in charge of the interests of the Guggenheims, both before and since the formations of the American Smelting & Refining Co., and the Guggenheim Exploration Co., will this month take charge of affairs of the Peñoles Mining Co., of Mapimí, Durango, as general manager. This company, which started something like ten years ago with a little 40-ton plant, caught at a depth of 800 ft. a large body of ore, from which good dividends soon came: they are now at a depth of 3,500 ft., producing and smelting 1,000 tons a day, employing over 4,000 men, and for some years have paid over a $1,000,000, Mexican, a year in dividends, the largest of any Mexican property. The position now taken by Mr. Dieffenbach has given rise to the belief that the company intends branching out, acquiring new mines, and building at least one more smelter somewhere in northern Mexico. The Mapimi district was thought for a long time to be possible only for large companies and deep mining, but development the last year has shown that this is not necessarily the case and a great deal of new work is being done. Among the more recent is that by San Francisco people, who have taken up 200 pertinencias in the southeast end of the camp, and have contracts for a 3,500-ft. adit to cut the vein. An English company is also negotiating for some good ground near by. It is reported that a rich strike has been made by Geo. Stinson down on the plain.

Of other late deals in the State of Durango, the Gavilanes, 75 miles west of the city of Durango, has been sold to Chicago people for $500,000, Mexican, and the first payment has been made; an Albany, N. Y., company has bought the Consuelo and Santa Ines, in Tlalco district, for $400,000 Mexican; and the Torreon smelter people have leased the Cabrillas of Francisco Zambrano, for four years, with the understanding that the royalties shall amount to at least $250,000, Mexican, of which $120,000 shall be paid in the first year, and with the privilege of renewing at the end of the term.

In the Santa Eulalia district of Chihuahua 16 diamond drills are now busy prospecting for various companies. The price paid for the Quebradillas, of Parral, by Grant G. Gillette, manager of the Pan-American Mining Co., was $475,000 gold, of which $5,000 was cash, $15,000 is to be paid on May 27, and the remainder at $25,000 every three months. In the Rayo mine, of Buena Vista, near Parral, a rich strike has been made, the vein being 16 ft. wide, with one streak 3 ft. wide and another 18 in., both of which run 5 oz. in gold. The property was already shipping 20 oz. silver ore.

In San Salvador, or Minas Nuevas, on Mitre mountain, near Monterey, La Fama of Emeterio de La Garza, Jr., is said to be in bonanza, and the Continental is preparing to make regular shipments.

The Dupont Powder Co., of Wilmington, Del., has taken an option, at $200,000, Mexican, on the sulphur deposits of E. C. Myers, near Los Humeros, Tezintlan, Puebla. M. L. Watts, of Los Angeles, Cal., is forming a company to work some sulphur deposits on Popocatapetl.

The Mexican National has finished broadening the gauge of its branch from Vanegas to Matehuala, San Luis Potosi, which will give better rates to the latter place by doing away with the cost of transfer and also the delay.

H. S. McKay, H. E. Carey and associates, who last year bought the Lluvia de Oro, in Chihuahua, for $2,000,000 gold, are said to be after a large group of mines in the old and now almost abandoned camp of Guadalcazas, San Luis Potosi.

S. Pearson & Sons, Ltd., are pushing the work of exploration for oil on the Isthmus of Tehuantepec. This work is under the direction of J. B. Body, and the product will be used by the Tehuantepec National Railroad for its engines.

---

**London.** April 30.

*(From Our Special Correspondent.)*

For some time past a new process for making fuel briquettes out of peat has been extensivley advertised. The press have been invited to inspect the plant and the promoters have been busy circulating glowing accounts. The prospectus of the company formed to acquire the patent, the Electro-Peat-Coal Co., Ltd., has been issued this week. From this it appears that the company is intending to erect near London a plant capable of treating 5,000 tons of peat a week, and also to form subsidiary companies, and to grant licenses to work. The figures relating to cost are entirely guess-work, and are put roughly at a maximum of 5s. per ton of the prepared fuel. It is assumed that the peat will cost nothing, the promoters cheerfully forgetting that an article, though valueless when useless, immediately becomes of value when there is a demand for it. The owners of millions of acres of bog lands in Ireland are not likely to give them away. No idea is given of the cost of the process. The principle of the process is to get rid of the water of combination in the vegetable fibers as well as the free moisture. The invention calls it "latent" water, but it is to be presumed that it is the water of combination that is meant. The peat is shredded and then placed in a rapidly revolving hydro-extractor to remove the free moisture. Then a current of electricity, the amount and pressure of which is not specified, is passed through the mass. This disintegrates the fiber and removes the water of combination, leaving a friable product that can be easily moulded into blocks. It is more than doubtful whether all this can be done for 5s. a ton. Another weak point in the promoter's statement is connected with the calorific power of the fuel produced, for the analysts seem to have mixed up metric measurements and British thermal units, and to have burned a kilogram instead of a pound and reported the heat evolved at a correspondingly higher figure. The best known names in connection with the scheme are Johnson & Phillips, the electrical firm at whose works the process was tested, but as far as can be ascertained, the firm are not in any way responsible for the process, their function being solely to supply current. Mr. Fletcher Moulton's name also appears vouching for the validity of the patents.

Some people have a way of thinking that the validity of a patent is synonymous for commercial value. The patentee is Mr. J. B. Bessey, and his British patent is 19,719 of 1902, which those of your readers may peruse who wish to follow the matter further.

Your readers will probably have seen accounts in the daily papers in America of a prosecution undertaken by the Lake George Mines, Ltd., against Gibbs, Bright & Co., of Melbourne, Antony Gibbs & Sons, of London, and others, claiming damages for misrepresentation in connection with the properties in New South Wales introduced by the defendants and sold to the plaintiff company. The case will probably last for some time, as may be judged by the fact that the opening statement of counsel took three days. In justice to the various parties directly and indirectly involved, I do not intend to refer in detail to the case until it has been heard right through. I would, however, mention that Antony Gibbs & Son is one of the most honored commercial houses in London. Everyone regrets that they have, probably through inadvertence, become mixed up in an action of this kind.

We do not hear much of Klondike nowadays in England. In fact most of the companies formed during the craze have been wound up. It was no little surprise, therefore, to find a new company formed over here to acquire properties in that region of the world. This company is the Bonanza Creek Hydraulic Mining Co., Ltd., and the object is to acquire, from Mr. Emil Weinheim, of Klondike, and Mr. A. W. Hallenborg, of New York, the Matson and Doyle concessions, covering about three square miles along the west side of Bonanza creek, extending from Adams creek to Boulder creek. The company has a nominal capital of £350,000, of which £300,000 goes in shares to the vendors. The sum of £20,000 in cash has also to be paid out of profits to the vendors. The company is not registered under the laws of the United Kingdom, but under those of Guernsey, one of the Channel islands. It is a growing custom among a certain class of promoters to dodge the British company laws by registering in Guernsey. There is nothing in the prospectus to show that the company is registered in this way, and the casual reader would naturally suppose that it was an English company. There is one good reason for registering in Guernsey, because the fees are much smaller than at Somerset House, but this, though the ostensible, is not the sole reason for this line of policy. The hindrance to the public in their endeavors to communicate with each other and to obtain information about the doings of the company has also something to do with it.

---

**Perth.** April 4.

*(From Our Special Correspondent.)*

A hearty welcome has been accorded to Mr. Richard Hamilton on his return from London. To an interviewer he spoke rather strongly about the uncertainty of managers' positions here, and said he wished more of our mines were locally floated and owned.

Great changes are contemplated in the treatment plan, etc., of the Golden Horseshoe, and further reduction of working cash will no doubt be the result; though any immediate improvement can only be the result of Mr. Sutherland's management.

The Great Boulder's main shaft is nearing the 1,900-ft. level, and the new drain shaft on the north end is being pushed on at the rate of about 100 ft. per month.

The Ivanhoe South Extended is sinking the main shaft and will not open out till 2,000-ft. level is reached, in order to cut the rich ore bored into at the 1,920-ft. level.

Good developments are being made in bottom levels of the Kalkuri. Additions to the milling plant are being pushed on with.

Exploratory work on the Oroya north block has been stopped at the point where the rich Brownhill shoot has been followed close to the boundary.

*Coolgardie.*—Bayley's mine has struck ore at the 800, 900 and 1,000-ft. levels. The reef is 3 ft. wide, assays from 1 oz. up to 7 oz. per ton, the bulk probably worth about 2 oz. per ton.

*Norseman.*—Good returns are being made. The Cumberland has put through its second crushing of 260 tons for 327 oz. This is ore raised from pure development work. The Princess Royal is opening one at the 500-ft. level. Additions are being made to its power plant, and electric lights being installed. The last fortnightly crushing was 750 tons for a yield of 595 oz. gold. The Princess Royal Central is pushing with main shaft. Rock drills are being installed. The country is a very hard diorite, so progress has been somewhat slow.

*Phillips River Copper and Gold Field.*—A report by the government engineer has been issued recommending the erection of smelting works. Many prospectors are raising good ore—about 200 tons per week—which will be increased. Great assistance has been rendered by the system of purchasing ores on an assay value basis. About 3,000 tons, valued at £20,000, has so far been purchased and awaits treatment.

The Premier's policy speech has created a good impression, as defining clearly the feeling about the so-called labor party. A new league called the National Political has been formed and is now at work. The main object is to combat the trades-unionists by organization.

## TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and be of any service to them that they can.

## TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodations in the city of London.

## PERSONAL.

Mining and metallurgical engineers are invited to keep the Engineering and Mining Journal informed of their movements and appointments.

Mr. Percy L. Fearn is at Mackay, Idaho.

Mr. J. B. Tyrrell is now at Dawson, Yukon Territory.

Mr. C. B. Flynn, of Durango, Mexico, is in New York.

Mr. Theodore E. Schwartz, of Denver, is at Chihuahua, Mexico.

Mr. Robt. T. Hill has left Washington, D. C., for Texas and Mexico, on his way to Acapulco.

Mr. J. Morgan Clements has returned to New York from Peru.

Mr. Hubert P. Barry is manager of the Waihi mine, New Zealand.

Mr. Irving A. Taylor is now on the staff of the Engineering Co. of America.

Mr. Walter M. Graves, Denver, Colo., is examining property in Oaxaca, Mexico.

Mr. S. J. Truscott is chief engineer of the Redjang Lebong mines in Sumatra.

Mr. W. B. Milliken, of Denver, is at present on a professional trip in New Mexico.

Mr. Arthur W. Johnston, of Chicago, leaves for Nome, in Alaska, at the end of May.

Mr. H. A. Keller has returned to New York from a professional trip in the Southwest.

Mr. Jas. W. Abbott has left New York to proceed to St. Louis, on his way to Denver.

Mr. R. H. P. Bullen is superintendent of the Ooregum mine, in the Mysore district, India.

Mr. H. Kilburn Scott, of London, has left for Italy and India on professional business.

Mr. H. B. White is general manager of the Geduld Proprietary mines in the Transvaal.

Mr. H. E. Tuttle, of Monterey, Mexico, has returned from a short trip to the United States.

Mr. Erik von Aminoff, of Freiberg, passed through New York recently on his way to Colorado.

Mr. R. M. Atwater, of Helena, Mont., has been on a visit to New York, leaving this city on May 6.

Mr. H. T. Waller, formerly in Tasmania, is now with the Mountain Copper Co. at Keswick, California.

Mr. J. W. Fryar, of the Sherwood colliery, at Mansfield, England, is visiting the Pennsylvania coal region.

Mr. G. D. B. Turner, of Salt Lake City, leaves New York for London by the *Carpathia* on May 17.

Mr. Geo. W. Wheelock, of the Engineering Co. of America, has returned from an inspection in Virginia.

Mr. E. Fleming Lengle has gone to Santiago Papasquiaro, in Durango, Mexico, to conduct mining operations.

Mr. G. S. Holbert, superintendent of the West Quincy mine, at Park City, Utah, is visiting New York.

Mr. W. L. Austin, recently in the Yaqui river region, of Mexico, is expected in New York about May 12.

Messrs. O. H. Fairchild and C. E. Brainard have removed their offices to 202 Mining Exchange Bldg., Denver.

Mr. J. Parke Channing has been at Milwaukee, Wis., and is now on his way to the copper regions of Arizona.

Mr. Jesse Scobey has returned to Denver and is preparing to leave for Guadalajara, Mexico, to be absent some time.

Mr. Chas. T. Mixer, of Park City, Utah, has been at Gilmore, Ida., in the interests of the Gilmore Mining Company.

Mr. Harry G. Maud, formerly of Denver, Colo., and recently in Siam, was in New York recently on his way to Cuba.

Mr. S. Johns, formerly at the Ferreira mine, is now manager of the Consolidated Langlaagte mines, at Johannesburg.

Mr. Frank Klepetko has returned to New York from a trip to Peru, in the interest of the Cerro de Pasco Mining Company.

Mr. A. H. Reed has become general superintendent of the mines belonging to the Kentucky Fluorspar Co., at Marion, Kentucky.

Mr. Llewellyn Reynolds, of Chicago, is now superintendent of the Keystone Copper Smelter Co.'s mines at Tapalpa, in Jalisco, Mexico.

Mr. E. H. Webster, formerly of Minas Prietas, Mex., has been appointed agent of the American Smelting & Refining Co., at Parral.

Mr. Juan Felix Brandes, who is now at Berlin, Germany, gave a lecture on Colorado mining before the Geographical Society of that city.

Mr. H. W. Hardinge returned to Denver from Mexico recently and left on a professional trip to Canada, whence he will proceed to New York.

Messrs. Ludwig Kloz, Harold Scheerer, and von Grabowski, from Mansfield, Germany, are visiting the mining regions of Colorado and Arizona.

Mr. Henry Hay is manager of the Witwatersrand Deep at Johannesburg, Mr. S. C. Thomson being consulting engineer of the same mine.

Mr. Albert L. Waters has been reappointed general manager of the Keystone Copper Smelter Co., of Philadelphia, with mines in Jalisco, Mexico.

Messrs Putnam A. Bates and John Neilson have formed a partnership for the practice of electrical engineering with offices at 42 Broadway, New York.

Mr. Wm. B. Duesler has resigned as superintendent of the Keystone copper mines at Tapalpa, in Jalisco, Mexico, to attend to personal interests in Tepic.

Mr. J. M. Connell, anthracite operator, of Scranton, Pa., and president of the Board of Conciliation, has gone to California for a stay of several months.

Mr. A. H. Beale, formerly superintendent of the open-hearth department of the American Sheet & Tin Plate Co. at Vandergrift, Pa., has become manager of the Eastern Steel Co., Pottsville, Pennsylvania.

Mr. H. V. Croll, formerly in charge of the Salt Lake City office of the Allis-Chalmers Co., has been placed in charge of the San Francisco branch of that company, succeeding Mr. Geo. Ames, who has resigned.

Mr. John A. Donaldson has been appointed manager of lake shipments for the Pittsburg Coal Co., with office in Cleveland, Ohio. He succeeds Mr. A. W. Horton, who has been appointed general western sales agent for the company.

Mr. L. F. Whitmore, chief engineer to Fraser & Chalmers, Ltd., has reached New York from London, on his way to the St. Louis Exposition, and expects to visit the most important installations of modern mining and milling machinery in this country.

Mr. Walter B. Devereux, who was recently elected a director of the Greene Consolidated Copper Co., has just returned from a two months' absence in the State of Sinaloa, Mexico, where he has been investigating the mineral resources of a large section of the State, in the interest of the Occidental Construction Co. Mr. Devereux has notified the Greene Co. that he will be unable to accept the position of director.

## OBITUARY.

C. C. Brown, of Springfield, Ill., president of the Latham Coal Co., of Lincoln, Ill., and of the Springfield Boiler & Manufacturing Co., died on Friday, May 6, aged 70 years.

Richard Boyd, aged 68, died at Seek, Pa., near Tamaqua, May 2. He was superintendent of the Lehigh Coal & Navigation Co.'s No. 10 colliery for 40 years, and was a member of the Masonic order.

## SOCIETIES AND TECHNICAL SCHOOLS.

HARVARD UNIVERSITY.—The summer course for mining students will be conducted by Charles H. White, instructor in mining and metallurgy. The instruction in detailed field work in this course will be given, as in the past two summers, in the San Juan and Needle mountains in southwestern Colorado. At the beginning of the course an excursion through New Mexico, Arizona, and southern California to the Pacific Coast, returning through Nevada and Utah, will afford opportunity for the observation of a number of the larger geological features in the region traversed. Those who give five weeks to field study and who submit a satisfactory report may receive credit for a half-course. The course will meet in St. Louis, Missouri, August 15.

## INDUSTRIAL.

The New York office of A. Leschen & Sons Rope Co. is now at 163 Washington street. C. A. Dunlavy is manager.

The Bristol Co., of Waterbury, Conn., is to show a complete line of recording instruments for pressure, temperature and electricity at the St. Louis World's Fair. A large number of the instruments will be in operation.

The Link-Belt Machinery Co. recently closed contracts with the Boston Coal & Fuel Co. for its tipple equipment at Franklin, Colo. This contract comprises shaking screens, elevators, crushers and one 12 in. by 12 in. McEwer engine.

The Allis-Chalmers-Bullock, Ltd., has been formed in Canada to take over the business of the Allis-Chalmers Co. and the Bullock Electric Co. The new company will occupy the old Canadian works of the Bullock company at Montreal.

The Whiting Foundry Equipment Co., of Harvey, Ill., will exhibit one of their three-motor electric-traveling cranes, 10 tons capacity, 45-ft. span, in the Model Foundry building at the World's Fair. This crane will be of the latest design and will be operated during the Fair.

The Pennsylvania Engineering Co., of Pittsburg, was recently organized by G. R. Delamater, James J. Connelly and L. A. Harding to conduct a general engineering business. The company will make a specialty of designing and contracting for coal mines, coke plants, coal washing plants, etc.

The Davenport Locomotive Works, Davenport, Ia., builders of light locomotives, booked recently an order for four switching engines from the Cerro de Pasco Mining Co., Peru, South America. The company also has orders for shipment to Mexico and Spanish Honduras, and is negotiating for some business in South Africa.

The Warwood Tool Co., of Wheeling, W. Va., is having plans prepared for a new plant about 10 miles from Wheeling. This company manufactures all kinds of mining tools and equipment. Victor Beutner, of Pittsburg, is the consulting engineer. A large amount of new machinery will be purchased, consisting of machine tools, hammers, etc. Power will be furnished by gas engines and machinery will be driven by electricity.

The annual report of the General Electric Co. for the year ending January 31 shows that profits were $7,865,377, as compared with $10,277,169 the preceding year. The report states that the New York Central & Hudson River Railroad Co. has ordered 30 electric locomotives, which will be used in hauling all trains on the main line within a radius of 34 miles of the Grand Central station, New York. Each of these locomotives will have a capacity of about 2,500 h. p.; the largest ever developed for steam or electrical work.

The S. H. Supply Co. of Denver, Colo., has purchased the complete smelter erected by the Robinson Construction, Mining & Smelting Co., at Robinson, Colo., in 1901. The plant was in operation only about 20 days. The principle machinery in this plant is: Two Loeder hot blast furnaces, built by the Colorado Iron Works Co.; two No. 7 Connersville blowers; one 275 h. p. Corliss engine; three 125 h. p. Brownell high pressure horizontal tubular boilers. The purchaser is dismantling the plant and will remove the machinery to Denver.

A large part of the new works of the Hadfields Steel Foundry Co., Ltd., Sheffield, Eng., is occupied in the manufacture of projectiles, armor plate, tramway and railway crossings, all made of Hadfields special steel. A section is devoted to crushers and rock breakers. It is only recently that the company has made the latter machines under its own patents. W. F. Kett, formerly with the Gates Iron Works, in England, is manager of this last-mentioned department. Fraser & Chalmers are agents for Hadfields specialties in South Africa.

The publication department of the B. F. Sturtevant Co. is to receive generous recognition in the new office building at Hyde Park, Mass. A portion of the high basement, about 40 ft. square, will be devoted to a press room and storage for paper stock and printed matter. A full equipment ,of type and of jobbing and catalogue presses will be installed. Immediately above this room and occupying one end of the first story will be the offices, with a full complement of artists, clerks, etc. The Sturtevant Co. has for several years maintained a printing plant of its own and is to-day carrying through all the work required in connection with its publications except the engraving. The department will be one of the largest and most progressive connected with any manufacturing concern of its character in the country.

The Link-Belt Engineering Co. received recently from the Delaware, Lackawanna & Western Railroad for the latter company's Truesdale breaker, near Scranton, Pa., an order for an open top carrier for run of mine coal from the mine to the breaker. Its capacity is 500 tons per hour, and is to be 330 ft. long. A reciprocating feeder supplies each bucket of the carrier with a regular and proper load. An order for a 5,000-ton locomotive coaling station at Macon, Ga., for the Georgia Central Railroad, was also received, it being the fourth plant of the kind installed for that company.

## TRADE CATALOGUES.

The new catalogue of engines and boilers issued by James Leffel & Co., of Springfield, Ohio, describes the making of Leffel engines and boilers and their individual advantages. It is well executed, and contains many good illustrations with detailed information of value to users of steam power.

The Kingsford Foundry & Machine Works, of Oswego, N. Y., is sending out a 62-page catalogue on centrifugal pumping machinery, describing briefly the Kingsford pump, which is a centrifugal pump manufactured by the company named. The descriptive matter also contains much information of interest to those contemplating the use of centrifugal pumps. The pumps are manufactured with the single or side suction, and are used in hydraulic dredging work to handle slimes, tailings, etc. Pumps for a variety of other uses are also mentioned.

Air compressors and rock drills manufactured by the Sullivan Machinery Co., of Chicago, Ill., form the text of circular No. 52-B., containing 24 pages, which that company has published. Illustrations are given of the Sullivan straight line air compressors with simple steam and compound air cylinders, with plain steam slide valve and poppet air valves, those driven by belt, and the single stage and two-stage air style. Tables giving dimensions, weights, etc., are included. Drills are shown on double screw mining column and on an adjustable tripod. Tables giving weights, prices, etc., are also added.

## GENERAL MINING NEWS.

*Chesapeake & Ohio Railway Co.*—Coal and coke shipments in March and the nine months of the fiscal year from July 1, were as follows, in short tons:

| Coal. | March. | July-Mar. |
|---|---|---|
| New River | 388,446 | 2,657,986 |
| Kanawha | 187,809 | 1,559,692 |
| Kentucky | 10,316 | 118,115 |
| | 586,571 | 4,335,793 |
| From connections | 17,173 | 144,982 |
| Total coal | 603,744 | 4,480,775 |
| Coke. | | |
| New River | 23,839 | 227,649 |
| Kanawha | 2,777 | 32,395 |
| | 26,616 | 260,044 |
| From connections | ..... | 150 |
| Total coke | 26,616 | 260,194 |
| Grand total | 630,360 | 4,740,969 |

Compared with a year ago, there is a substantial improvement, especially in the shipments of coal to western points.

### ALABAMA.

CLEBURNE COUNTY.

*Clear Creek Mining Co.*—This company has placed a contract with the Crocker-Wheeler Co., of New York, for a 100-k. w. engine type electric generator for direct connection to a new Ball & Wood engine, to be used at its plant at Arbacoochee. The new machinery will represent an outlay of $60,000. The company has also placed a contract with the Pittsburg Dredging Co. for a dredger for working the placer beds.

### ALASKA.

*Kasaan Bay Mining Co.*—E. B. Palmer and A. J. Hills, receivers for this company, announce that the property of the corporation will be sold May 26, at Kasaan and Karta Bay, where much of the property is located. The property will be taken over by the bondholders, it is reported, who will reorganize the corporation and also take care of the stockholders in the reorganization. The headquarters of the company are at New Haven, Connecticut.

### ARIZONA.

MOHAVE COUNTY.

*(From Our Special Correspondent.)*

*Black Mountain Mining Co.*—This company, at Union Pass, A. I. Richardson, general manager, is preparing for much new work. A rock crusher and cyanide tanks are to be installed.

*Cedar Valley Mining Co.*—This company, at Cedar, has its wagon road from Yucca completed, and will haul in the machinery and install its smelter.

*Cracker Jack.*—Fred Mitchell and John Hughes are taking out high grade gold, silver and copper, ore from this mine near Chloride.

*Infallible.*—W. S. Fletcher, of Pasadena, Cal., general manager of the company owning this and the Star Spangled Banner mine at Stockton Hill, is making preparations looking to the erection of a lead stack to the smelter at Needles, Cal., for handling the ore. Several other mines in camp have been taken over by this company, and all are to be worked under one management. Maj. W. A. Mensch is the local manager.

### CALIFORNIA.

AMADOR COUNTY.

*Amador-Climax.*—The mill is running on rock worth $7.80 per ton. A new hoist is to be installed and sinking resumed.

*Bunker Hill.*—Ore from this mine is being taken from the 800, 1,200 and 1,500 levels, and about 90 tons a day are being crushed; 55 men are employed.

*Keystone.*—This mine, at Amador City, worked continuously for over 50 years, is employing 100 men. In addition to the 60 stamps there are several Griffin mills. The mine is owned principally by M. J. McDonald, of San Francisco.

CALAVERAS COUNTY.

*Gwin Mine Development Co.*—The good ore recently struck in this mine at Gwinmine, F. F. Thomas, manager, is on the 1,900 level, and is milling about $40 per ton.

*Rodesino Mining Co.*—Arrangements are being made to work this mine, near El Dorado, on a large scale.

*Sheep Ranch.*—This mine, at Sheep Ranch, will shortly be started with a change in management.

*(From an Occasional Correspondent.)*

*Wilbur-Womble.*—The suit brought by J. T. Womble and wife against I. R. Wilbur, E. I. Braddock and the Stockton Savings Bank, affecting the Wilbur-Womble mine at Hodson, has been decided by the Superior Court of San Joaquin county at Stockton. Upon the trial the following facts developed: On May 24, 1900, John T. Womble entered into an agreement with I. R. Wilbur whereby he agreed to sell to Wilbur all of his right, title and interest in 479 acres of land in Calaveras county, and upon which is situated the above named mine. The purchase price was to be paid by installments, the dates and amounts of which were set forth in the agreement, and in the contract was an agreement that any and all installments remaining unpaid on July 10, 1901, should thereafter bear interest at the rate of 6% per annum, and provided further that if any of the installments of the purchase money should remain unpaid for 60 days after they became due, that Womble should have the right and privilege of withdrawing said deed from escrow, terminating the agreement, in which event Wilbur should forfeit all payments that had previously been made. A deed was made on the same day with the agreement, and was placed in escrow in the Stockton Savings Bank, to be delivered upon receipt of the payments at the dates set forth; but the letter of escrow did not refer to the agreement, or to any interest on deferred installments, except that if any installments remained unpaid for 60 days, that then there should be interest paid. This agreement was not recorded until December 8, 1902, and on September 7, 1901, Wilbur made a deed to said lands in favor of E. I. Braddock, and that deed was delivered at the Stockton Savings Bank with a letter of instruction that it should be held the same as the deed from Womble to Wilbur. The payments were made at the times demanded, and were accepted by Womble until about a year ago, when he demanded from the bank that it should surrender to him the deed placed in escrow because no interest had been paid, which was refused by the bank. Prior to the time when the last payment became due, Braddock tendered the money then due to Womble, and he refused to accept it; so he deposited it with the bank to the credit of Womble, and so notified him. At the trial it developed that Mr. Braddock knew nothing about the interest clause at the time he purchased. Womble asked the Court to declare a forfeiture and order the deeds canceled, and the contract annulled. The Court decided that there was no forfeiture under the contract, and that Braddock and the Stockton Savings Bank should have judgment against the plaintiffs for their costs, but held that Wilbur should pay the interest, amounting to about $900, but that he was entitled to a credit of two years' occupancy of the premises at $150 per year. Braddock and the Stockton Savings Bank were represented by J. C. Campbell, of San Francisco, and Arthur L. Levinsky, of Stockton.

KERN COUNTY.

*Fairview.*—The new 5-stamp mill at this mine, Rosamond, has made its first run. Some high-grade ore is being taken out.

*Milwaukee Mining Co.*—This company, at Rosamond, is putting up the building for a new 10-stamp mill.

MADERA COUNTY.

*Gambetta.*—The mill of this mine, at Grub gulch, will shortly be started with a capacity of 100 tons per day.

MONO COUNTY.

*New Bodie Mining Co.*—The Loose Bros., of Bodie, have located 30,000 in. of water on the Walker river below Henry Hayes' toll-house, where a power plant will be built for use by this company at Bodie.

NEVADA COUNTY.

*Round Mountain Champion.*—This mine has been bonded by Huckins Bros., A. Scrivener and J. Stamphli, who intend putting up hoisting works and developing it.

*Standard.*—T. F. McAvoy, who has been acquiring large interests in this mine of late, will soon have hoisting machinery on the property.

PLACER COUNTY.

*Big Dipper.*—This famous old drift mine at Iowa hill has again struck good pay gravel.

*Turkey Hill Consolidated Mining Co.*—This company has been incorporated to work the Turkey Hill mine at Michigan Bluff with the following directors: Wm. C. and Wm. Muir, of Michigan Bluff; W. C. and W. W. Chapin, of Sacramento, and J. D. Meredith, of Auburn.

SAN DIEGO COUNTY.

*Himalaya Mining Co.*—This company, at Mesa Grande, of which Mr. Tannenbaum is principal owner, has the new tunnel in 200 ft., and expects to reach the deposit in 100 ft.

SHASTA COUNTY.

*Gambrinus.*—This group is to be fully developed by its new owners and a 20-stamp mill will be built.

*Keystone.*—Preparations are being made for considerable development work on this mine at Old Diggings, and a smelter is to be put up at Whiskytown.

*Midas Mining Co.*—At this mine, Harrison gulch, about 60 men are at work. The mill is crushing, and the cyanide plant will shortly be started. Some trouble has been threatened by the strike agitators, and men have been interfered with coming to the mine, but no serious outbreak has occurred as yet.

*Quartz Hill.*—This mine, near Calumet, has been closed down for a time, owing to influx of water from the rains. The mine has been shipping considerable ore to the smelters at Keswick.

*William Jackson.*—Warfield, Fleming & Miller have leased this old mine at Whiskytown.

SIERRA COUNTY.

*(From an Occasional Correspondent.)*

*Mountain.*—At this mine, near Sierra City, preparations are being made to resume the work of re-opening the property, as soon as the snow, which is melting rapidly, disappears. Tunnel No. 3, which was cleaned out and retimbered its entire length of 1,700 ft. last season, disclosed a satisfactory condition in regard to ore, and the upper tunnels, No. 2 and No. 1, will now be repaired and put in working order. A contract will be let for the extension of No. 4 tunnel 200 ft., within which distance, it is expected, the ore-bodies will be encountered at a depth of 750 ft. below No. 3. The tramway will also be repaired and four new towers constructed to support the cables. There is a large tonnage of milling rock above No. 3 tunnel, and it is expected to have the 10-stamp mill in full operation by August. This property is being operated by L. H. Carver, a mining engineer of San Francisco.

SISKIYOU COUNTY.

*Advance.*—Final payment on this mine, on Salmon river, has been made to J. D. Johnson by A. H. Denny, R. R. Denny, J. P. Baker and others. The mine is under bond to J. C. Brokaw, who has run 120 ft. on a 300-ft. tunnel.

*Finlay-Johnson.*—At this mine, in White's gulch, on the Salmon river, a chute of $70 rock has been struck by the Baldwin Co., working the mine under bond. The ore was found in the old works of the mine.

*Mitchell & Co.*—This company is about to prospect a ledge recently found on Humbug, and are putting up a steam arastra.

*Mount Vernon.*—At this mine, Cherry creek, near Yreka, a streak of rich tellurium is reported on the foot-wall of the vein. The mine is owned by a Spokane, Wash., company, Geo. V. Gray having sold out.

TEHAMA COUNTY.

*Basler.*—This mine, west of Red Bluff, is reported to have struck rich ore. There has been

a lot of litigation over the title to this property, and a case on appeal is still pending in the Supreme Court. It involves the question of right to enter upon a homestead to drive a tunnel. C. M. Basler, representing Sacramento men, is in possession.

TRINITY COUNTY.

A mile of the channel of the Trinity river near Douglas City is to be laid bare for mining by turning the stream through an 800-ft. tunnel to be cut through Horseshoe Bend.

TUOLUMNE COUNTY.

*Contention.*—Work is to be commenced on this mine at Knight's creek. Summer Bros. have a 5-stamp mill on the claim.

*Cordova.*—High grade ore has been uncovered in this mine, and the force of miners has been doubled.

*Eureka.*—This mine, near Groveland, has been sold by J. A. Wahl to A. Trittenbach.

*Mountain Lily.*—The 5-stamp mill is crushing good ore on this claim. The tunnel has been run 1,200 ft.

*Prudhomme.*—A force of men is unwatering this mine, near Arastraville, and doing other work.

*Republic.*—At this mine, idle for some time, the 4-stamp mill has been started up.

*Santa Ysabel.*—Considerable money is being spent in reopening this mine. E. C. Loftus is superintendent.

*Star.*—This mine, owned by Hayes Bros., of San Jose, is yielding good ore. The vertical shaft is 400 ft. deep, and the vein is about 4 ft. wide.

YUBA COUNTY.

The land in the Hansonville district owned by Col. Rackerby was some time since bought by Col. Forbes, and recently part of it was bonded for mining purposes. The Sebourg & Davis mine and mill, the Spanish mine and half a dozen more quartz properties have been bonded by San Francisco and Pasadena men, and shafts are being sunk to develop them. The old Hansonville mine, containing a large ledge of low-grade ore, which was worked 40 years ago for a time, is to be reopened.

*New Blue Point.*—This mine, near Smartsville, is to be worked by hydraulic process if the California Debris Commission grants a permit.

## COLORADO.

BOULDER COUNTY.

*Forest Queen.*—This tunnel is being extended to unwater the winze, as rapidly as possible, and open up large ore bodies for stoping.

*Pilot Mining Co.*—A new shaft house is going up rapidly and hoisting machinery will soon be installed. The shaft on the Pilot vein has been enlarged and timbered. The property is near Sunshine.

*Victoria.*—This gold mine above Salina, was sold at sheriff's sale May 3 to Luke W. Fowle for $48,000, that being the amount of judgment and costs he held against the same. Portions of the mine worked by lessees have paid very well for the last two years.

CHAFFEE COUNTY.

*Vivandiere.*—The Twin City Development Co., operating this mine and 50-ton mill in the Turret district, has encountered a 2-ft. body of gold bearing ore running $60 per ton in the 400-ft. level. A 50-ton concentrating mill was completed recently and is now turning out a good grade of concentrates.

CLEAR CREEK COUNTY.

*Consolidated Gem.*—Water has ben turned into the reconstructed flume of this company, and the plant is now working satisfactory. The flume is nearly one mile in length, is 4 ft. deep and 7 ft. wide, and has a head of 85 ft. Two turbines are used which operate generators, each with a capacity of 200 k. w., or equivalent to 800 horse power.

*Clift.*—This old property, on Democrat mountain, near Georgetown, has been transferred to the Saxon Mountain Mining Co. for $15,000. The deal was made by D. W. Shepard. The upper level has been driven 75 ft., and it is expected that by pushing the bore another 100 ft. the point will be reached where the veins of the Silver Glance and Rogers cross. Level No. 2 is in 700 ft. Level No. 3 has been driven 500 ft. No. 4 is in 706 ft. The lower level is in 800 ft., but no stoping was ever done. There is a large body of quartz in the breast, carrying an occasional streak of high grade ore.

*Mendota.*—The new tramway, near Silver Plume is now completed and in working order.

*Sunburst.*—About 500 sacks of assorted ore were shipped recently from the lease of Jones & Co. The recent upraise thoroughly ventilates the entire property. Their ore shoot is fully 500 ft. in length, and varies from 6 to 18 in. wide.

*Terrible.*—The mill on this property has resumed operations after a shutdown of eight weeks, caused by the freezing of the large pipeline. Five machine drills are being used in the different levels, and it is stated that two more will soon be added. Forty men are employed in the mine.

*Vidler.*—A 6-ft. blind vein is reported cut in this tunnel. Arrangements are being made to build a dam in the gulch near Vidler lake to control the water supply. A pipe line will be run from this point 800 ft. to the portal of the tunnel, and the power will be used in operating a plant of machinery. It is estimated that between 20 and 25 h. p. can be derived for at least eight months in the year.

*Whitney.*—It is reported that this company will soon increase its working force to over 150 men in the near future. The great drawback during the past winter has been frozen water pipes which furnish power to run the 100-ton concentrator and air drills.

DENVER COUNTY.

*Union Extraction & Reduction Co.*—The sheriff has been instructed to sell the entire property of this company. The District Court has decreed that the corporation is in debt $162,500 and costs. The International Trust Co., as trustee for the bondholders, secured the order of sale. The property includes the plant at Denver for treating copper, also mining property in New Mexico and Saguache county, Colo., and various notes and stocks.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

The April shipments of smelting and crude ores, mill tailings and concentrates from the Black Hawk depot to the Denver smelters and outside points of treatment were 213 cars, or 4,260 tons.

*East Calhoun.*—Sternberger Bros. are making preparations to commence work on this property, in Leavenworth gulch, are cleaning out the 200-ft. shaft and will install a small plant of machinery. The property is in that section where the pitch-blende or uranium ores have been found. Fred Wood, Russell Gulch, Colo., is superintendent.

*Nugget.*—Eastern parties have taken hold of this property, in Illinois-Central district, under a lease and bond and commenced developments. The main shaft is down 250 ft. and a first-class plant of machinery is on the property.

*London.*—The Gilpin Mines Development Co. has taken a lease and bond on this property, on Gunnell hill, and installed a gasoline hoisting plant. The shaft is down 160 ft. and is to be deepened. A good average grade milling and smelting product has been taken out by local owners. W. Kiley, of Central City, is in charge.

*Orado Gold Mining Co.*—Ore has been uncovered in the 400 west level of the Orado property, which carries over 4 oz. gold and 12 oz. silver per ton. A number of leasers are at work and regular shipments of smelting and milling ores are being kept up. A. Skeels, Central City, is manager.

OURAY COUNTY.

*Imogene Basin Gold Mine Co.*—This group adjoins the Camp Bird. The development consists of exploration with 10 men at the 300-ft. Forrest shaft. At the 300-ft. level drifting and crosscutting is in progress on the Chicago and other veins. The principal development and drainage tunnel starts in Spirit gulch and is now in the hill 700 ft. Electric drills are making 6 ft. per day. This tunnel, when extended in 3,000 ft., is expected to cut the veins of the group 1,700 ft. from the top of the mountain.

*Silver Ledge.*—Manager Joe Warner, of this mine, in Red mountain district, is reported negotiating for an electric process of zinc extraction. Large bodies of ore, from 3 to 15 ft. in width, are said to be blocked out, and the stopes are in prime condition for a big output.

*Snow Flake.*—Work will be resumed at once on this property in Red mountain district. The property is owned by Van Horn & Anderson, and was closed down last fall for lack of water. It is a new mine, but fair bodies of ore have been developed.

*Treasury Tunnel.*—This company is reported to have opened rich ore on the Corn Cob vein and is arranging to build a mill to treat its ore.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville mines shipped 70,000 tons of all classes of ore during April. Of this amount, some 50,000 tons were handled by the American Smelting & Refining Company.

*Harvard.*—The new shaft is almost completed and is in ore which shows the same grade as that found in the El Paso. A 3,000-ft. drift will connect the Harvard and El Paso shafts.

*Ibex Mining Co.*—John F. Campion, general manager, is preparing for extensive new developments below the 1,200-ft. levels and is hurrying the plans for leading shafts Nos. 1, 2 and 3 in blocks.

*Morning Star.*—The Hensley lease, which recently encountered ore in new work, has begun regular shipments.

*Resurrection Gold Mining Co.*—Manager C. T. Carnahan is arranging to run the big concentrating mill full force by May 20. The mine is shipping about 800 tons a month of fair-grade ore. The mine will handle 150 tons daily of milling material.

*Saguache Hydraulic Mining Co.*—This company is arranging for work in its territory, near Twin lakes. J. Corbin will be the superintendent and several hundred men are to be placed at work. The principal work will be done in New York gulch and a good plant of machinery is being put in place in addition to electric installation already in position.

*Searl.*—A litigation of long standing has just been settled in the United States Supreme Court affecting this placer property. The decision states that lode claims cannot be located on placer ground and is a blow to the Clipper Mining Co., which has been fighting for the lode locations made by it on a part of this territory. The decision also settles the disposition of $12,000 royalties.

*United Mining & Development Co.*—This concern is carrying on diamond-drill exploration work on West Rock hill. Several new drill holes are to be started soon.

SAN JUAN COUNTY.

*North Star Silverton Mining Co.*—The plant of this company, near Silverton, is being repaired and is expected to be in operation very soon. The plant is equipped with two crushers, 20 stamps, 10 Dillon concentrating tables, etc., and has a capacity of 60 tons daily, running with two shifts. The machinery was furnished by the Holthoff Machinery Co., of Milwaukee, Wis. Manager Henahen is in charge.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

*Golden Cycle.*—This property has closed down on account of litigation with the adjoining Theresa, and it is claimed that some of the ore taken from the Cycle property came from veins having their apices on Theresa property. The last named property is controlled by J. T. Miliken, who has also control of the Golden Cycle.

*Londonderry-Wild Horse.*—The trial was concluded the first part of the week, and the judge stated that a decision would be given in 10 days.

*Portland Gold Mining Co.*—It is rumored that this company is to buy some of the Bull

hill ground of the Stratton estate, which is in the vicinity of the Portland property. So far this rumor has not been confirmed.

*Stratton Estate.*—Work on company account on some of the Bull hill properties of this estate is to be commenced the first of next week. It is understood that the work will be done through the Eagle's shaft, which is one of the deepest in the district. Most of the leases let recently on this property reserve all ore under $15 per ton. A change has been made in this recently, and now the lessees are allowed to take all the ore above $10 per ton. This is quite a help to the lessee as, with the present rate of treatment, $15 ore can be treated with a profit.

*Stratton's Independence.*—The pumps on the lower levels of this property have been pulled, and no work is being done below the 900-ft. level. A very large amount of development work has been done on the lower levels of this property, and, as far as can be learned, no ore of any considerable value has been found. It was reported some time ago that the property would be leased, and it is understood that a number of applications for leases have been made to the company, but so far none have been granted.

## IDAHO.

### SHOSHONE COUNTY.

*Bunker Hill & Sullivan.*—About 400 men are being worked at this mine at Wardner. Water-power is mostly used, but some power will be taken from the Spokane electric line. Between 4,500 and 5,000 tons of concentrates and ore were shipped during April.

*Coeur d'Alene Gold Mining Co.*—Work has been resumed on this placer property, near Murray, on Prichard creek, with 12 men under John Murphy. A part of the stockholders of the company have taken a lease on the property and are superintending the operations.

*Last Chance.*—A 100-h. p. motor was installed recently at this mine, the Wardner property of the Federal Mining & Smelting Co., to increase the power of the compressor, which is operated with a 150-h. p. motor. The ore here is mined, transported and milled by Spokane electric power, while the mine is kept free from water by electric pumps. The company's mill at Sweeny is almost entirely operated by electricity, only a small percentage of water power being used.

*Morning.*—Thomas L. Greenough has closed a contract with the Washington Water Power Co. for 500 h. p. of electricity to operate all the machinery of this mine, near Wallace, on the Coeur d'Alene river. The power will be used to compress air which will be used to run the drills, the hoists and all the other apparatus. The contract is for a minimum of 300 h. p. for five years at $50 a horse power per annum, and goes into effect September 1, 1904.

*Skookum.*—According to the finding of Judge Warren Truitt, of Moscow, in this famous case, Kennedy J. Hanley, of Wardner, is entitled to $260,672.43 from the Empire State-Idaho Mining Co., in which Charles Sweeny is interested. In addition Hanley has about $100,000 to his credit in bank pending a settlement of the case. Judge Truitt was appointed special examiner under order of the Federal Court and reports that he finds the date when the defendant ceased to exclude complainant from the mine was February 15, 1902. He recommends that January 1, 1902, should be adopted as the date when Hanley's exclusion from the mine ceased, and files the following statement of account, showing the amount due from the Empire State-Idaho Co.: One-eighth of gross proceeds of mine from May 15, 1898, to March 18, 1899, fixed by decree, $38,577.41; one-eighth of gross proceeds from March 18, 1899, to January 1, 1902, $210,710.05; total gross to January 1, 1902, $249,287.46; one-eighth of net proceeds from January 1, 1902, to February 15, 1902, $5,763.97; one-eighth of net proceeds from February 15, 1902, to May 17, 1902, $5,621; total, $260,672.43.

*Snowstorm.*—Returns from copper ore shipped to the Tacoma smelter from this mine, near Mullan, show that the first six cars netted $4.50 per ton, while the following ones have increased to $7.50 and $8 per ton. A contract had been entered into with the Tacoma smelter to treat 100 tons per day.

## ILLINOIS.

### DAVIESS COUNTY.

*Joplin Separating Co.*—Arrangements are reported made for the building by this company of an ore separating plant at Galena for the separation of iron and sulphur from zinc ore and also lead from zinc, and to turn low grade concentrates into the highest grade concentrates possible. C. C. Mathey, of Galena, is interested.

## MICHIGAN.

### COPPER—HOUGHTON COUNTY.

*(From Our Special Correspondent.)*

*Atlantic.*—This mine produced 309.75 tons of mineral in April.

*Baltic.*—The April production of this mine was 780 tons of mineral.

*Champion.*—This mine produced 718.5 tons of mineral in April.

*Franklin.*—The production of this mine in April was 352.25 tons of mineral.

*Osceola Consolidated.*—At the North Kearsarge branch of this mine 57 drills are working and the production is showing a steady gain. At the South Kearsarge 39 drills are in operation.

*Quincy.*—The April production was 1,119.25 tons of mineral.

*Tamarack.*—A 200-ft. diamond drill-hole will be sunk from the bottom level of No. 2 shaft, reaching 4,555 ft. from the surface. Rock shipments from No. 3 shaft are now at the rate of 1,050 tons per day.

*Trimountain.*—James Richards, Jr., has been appointed master mechanic at the stamp mill on Lake Superior, succeeding James Vial, resigned. The output in April was 750 tons of mineral.

*Winona.*—The April output of this mine was 47.75 tons of mineral.

*Wolverine.*—This mine produced 502 tons of mineral during April.

### COPPER—KEWEENAW COUNTY.

*(From Our Special Correspondent.)*

*Allouez.*—This company has contracted for a compound double-conical drum-hoisting engine with cylinders 32 by 72 in., capable of elevating a 7-ton load from a depth of 6,000 ft. Excavating for the foundation of the engine-house will start next week, and it is planned to have the plant in commission in one year. The shaft sinking to strike the Kearsarge lode is down about 640 ft.

*Mohawk.*—The April output of this mine was 500 4-5 tons of mineral.

*Phoenix Consolidated.*—This company will start work shortly on a coal dock at Eagle river, on Lake Superior. A gravity tram will be built between the dock and the stamp mill. The April production was 105 tons of mineral.

### COPPER—ONTONAGON COUNTY.

*(From Our Special Correspondent.)*

*Mass Consolidated*—This mine produced 140 tons of mineral in April, 60 tons of which was mass and barrel work. Sinking in B shaft has reached the 14th level, and the plat is now being cut at that point. The drift west on the 13th level is in 275 ft. and has encountered some very strong copper ground. Shaft A is showing some good copper rock in the drift west on the 13th level, 450 ft. from the shaft. All the levels above the 13th are in good ground, and as the workings deepen the quality of rock gradually improves.

*Michigan.*—S. S. Jennison, master mechanic, has resigned. Rock shipments to the Mass mill, where one head is used, average 500 tons per day. The stockpiles are being shipped.

*Victoria.*—It is expected that this company will start work on the new stamp mill this summer. The rails for the tramway to connect mine and mill have been at the mine for a year.

## MINNESOTA.

### IRON—MESABI RANGE.

*(From Our Special Correspondent.)*

One shift has been laid off at all the mines at Eveleth on account of a lack of stockpile room, due to the late opening of navigation. This affects the Fayal, Adams and Spruce, all of which are United States Steel Corporation mines.

Nearly 600 men have been put at work on the two stripping contracts recently resumed by the Drake & Stratton Co., 300 each at Stevenson and Leonard. Their stripping operations at Fayal are employing a force about as large. At these three mines present contracts and plans call for the removal of not less than 4,000,000 cubic yards of material.

Sligo furnace, St. Louis, is to use Mesabi ore again the coming season, and has made purchases, largely of Stevenson, which will go south all rail, by the Great Northern and its connecting lines.

*Mahoning Ore & Steel Co.*—This company will carry on stripping during the summer and will mine a little less than the usual annual product of 1,000,000 tons.

*Pitt Iron Mining Co.*—Arrangements are being made to re-open the Miller mine in section 4-58-15. Machinery has been put in the past winter and buildings erected for a considerable product. The mine will be arranged underground for a through tramming system that is expected to make tramming to shaft quite reasonable. This mine pays a royalty of 35c. a ton, with an annual minimum of 100,000 tons. It is operated for the LaBelle Iron Works.

*Scranton.*—The mine owned by Picklands, Mather & Co., and the Lackawanna Steel Co., has been closed indefinitely on account of the excess of water in the workings. It will be reopened when conditions are more favorable.

*Susquehanna Iron Co.*—Tracks of the Great Northern road are being built into the Susquehanna mine, at Hibbing, coming from the main line a mile or so southward. This mine will ship its entire product over that road. The mine is being rapidly developed and extended underground and is now prepared for a large product this season.

*Tesora Mining Co.*—Stripping operations at Forest mine are now under way. This is a small job, for the ore-body is in many places only 6 to 8 ft. below surface, and the total area is not large. The mine has been opened underground to a small extent, and exploration has been under way since last year. It mines a grade of bessemer hematite that will be in demand at good prices.

### IRON—VERMILION RANGE.

The surrender of the striking miners at the Chandler and Pioneer mines at Ely, was absolutely unconditional, and was induced, in addition to the weakness of their position, by the demands of the merchants of the town. The mines will not open till after navigation has resumed. In addition to letting these mines remain idle, the Oliver Iron Mining Co. has closed its other mines on the range, and now none are operating. The reason given for closing the remaining three was that stockpile room had been exhausted.

## MONTANA.

### LEWIS & CLARKE COUNTY.

A Washington despatch says that in the case of the St. Louis Mining & Milling Co. vs. the Montana Mining Co., the United States Supreme Court has decided that the owner of a lode mining claim cannot by means of a tunnel explore the sub-surface of an adjoining claim, even though the tunnel be run to tap a vein the apex of which is on the claim of the owner of the tunnel. The St. Louis Co. sought thus to work a vein apexing on its ground, but dipping through the side line under the property of the Montana Co. The Circuit Court of the district of Montana issued an injunction and the deci-

sion was sustained by the Circuit Court of Appeals for the ninth circuit. That opinion in turn is now affirmed. The court holds in effect that the vein itself may be followed, but that in no other way can the adjoining territory of another mining property be explored.

MADISON COUNTY.

*Damours Gold Mining & Milling Co.*—This company, of Springfield, Mass., owning property at the head of Alder gulch, eight miles from Virginia City, is reported to have placed an order with Allis-Chalmers Co., of Chicago, for a 10-stamp mill and concentrating plant, complete.

## NEVADA.

NYE COUNTY.

*Tonopah Mining Co.*—At the annual meeting held recently the financial statement presented was as follows: Receipts from smelter for ore treated from March 1, 1903, to February 29, 1904, $598,224; royalties, $12,430; other receipts, $4,821; balance on hand, March 1, 1903, $187,329, making a grand total of $802,804. Expenditures were $480,404 for operating the property at Tonopah; $4,280 for rent, etc., at Philadelphia; $14,714 for wages; $4,010 adjusting outside claims; $23,964 interest on preferred stock; $999 taxes and insurance; $29,880 railroad construction account; $1,969 due lessees on or shipped to smelter; $215,283 cash on hand March 1, 1904.

## NEW JERSEY.

*New Jersey Iron Mining Co.*—It is reported that Joseph Wharton, of Philadelphia, has acquired possession of all the property of this company, which owns several mines in Morris and Sussex counties. These include properties at Hybernia and Mount Hope, with the old mines near Sparta, and the Hurd mine near Lake Hopatcong. The Hurd has been closed for several years and only two or three of the other mines are now operated.

## OREGON.

BAKER COUNTY.

*Bonanza.*—A rich ore body is reported opened on the 1,100 ft. level of this mine near Baker City.

*Emma.*—Electricity has been installed as motive power for the hoist at this mine, near Baker City, and it is stated will be used later for the mill.

*Gem.*—Work is to be resumed shortly on this mine in the Sparta district. The mine is equipped with a first class 20-stamp mill.

*Golconda.*—This mine in the Cracker creek district, employing about 40 men, has shut down for a few weeks to make repairs.

*Psyche.*—Judge Eakin, at Baker City, ordered the Psyche mine, Greenhorn district, to be sold at public auction May 31, to satisfy a judgment of $5,000 secured by R. H. Miller, and others. The Psyche is owned by Judge Fawcett, of Omaha, and by the order cannot sell for less than $40,000.

*Standard.*—A large reduction mill will be erected on this property, near Sumpter, this season, it is reported. A 25-ft. vein of low grade ore was cut recently.

JACKSON COUNTY.

*Millionaire.*—This property, near Grant's Pass, has been sold by Davidson, Ward & Co., heavy owners, for $40,000. The new owners secured an option last year and have had 15 men at work all winter developing. The force will now be increased and machinery installed.

## PENNSYLVANIA.

ANTHRACITE COAL.

*Lehigh Valley Coal Co.*—A fall of coal and rock in a breast of the Continental colliery of this company, at Ashland, May 5, imprisoned two miners. The rescue party was forced to abandon work by a second fall later.

*Lehigh Valley Coal Co.*—This company will erect a large breaker at No. 4 workings at Jeanesville, near Hazleton, as soon as the water is pumped from the mine. Pumping has been going on for several months. The company is boring for coal near No. 4.

*Lehigh & Wilkes-Barre Coal Co.*—An explosion of gas occurred at the No. 11 colliery of this company, at Plymouth, May 5, in which two men were killed, one fatally injured and four others burned.

*Lorberry.*—The Warnke Coal Co., which has a washery at Duryea, is reported to have purchased near Pottsville this old mine property, the transfer being made by Losh, Snyder & Co., who have been mining it. The sale includes the colliery and the culm dump. The old breaker will be torn down at once and on the site will be built a modern combination breaker and washery. The Pottsville corporation will be known as the Warnke Coal Co. No. 2. William Featherman, of Duryea, will be the superintendent.

*Philadelphia & Reading Coal & Iron Co.*—Fire broke out in the Locust Gap slope, May 5. and at last reports was still burning. A gang of timbermen were working in the air course when a spark from a naked lamp started the fire. Five men are believed to be imprisoned. The Locust Spring colliery, which prepares the Gap slope coal for market, was shut down by the fire, 1,000 men and boys being thrown out of employment.

BITUMINOUS COAL.

Broad Top coal shipments for the week ending May 7 amounted to 11,715 tons, making a total of 286,239 tons since January 1.

## TEXAS.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

*Beaumont Oil Field.*—Chas. Dillingham, of Houston, Tex., and John K. Townsend, of New York, have been appointed receivers of the property of the Houston Oil Co. in Texas and Louisiana.

Indictments have been returned against eight promoters and directors of the Beatty Oil Co. and the Dividend Oil Co. The charges are based on the common practice during the oil boom of selling individual or promoters' stock instead of treasury stock, as set forth in the prospectus.

Crude oil is worth 48 to 52c. at Beaumont, 40 to 45c. at Sour Lake, and what little Batson is sold to outsiders at 60 to 61c. Production is stationary and slightly below consumption.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

*Batson Oil Field.*—New wells in are the Heywood Oil Co. No. 2, Guffy Petroleum Co. No. 3, State Line well, Marshall well, Wing No. 5, Marx Gilborough No. 2, W. E. Brice, Little & Mitchell, Hamill Bros., Buffalo Oil Co., Pickway Syndicate and Margaret Helen Syndicate.

*Higgins Oil Co.*—This company's 6-in. pipe line to Sour Lake has been completed, making six lines in operation. Refining companies are taking most all of the crude oil.

MATAGORDA COUNTY.

(*From Our Special Correspondent.*)

*Matagorda Oil Field.*—Reports of a big gusher at Big Hill caused great excitement. The blow out was principally mud and water and the well is good for perhaps 15 bbl. daily.

## UTAH.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

*Beaver-Harrison*—On the 500-ft. level of this mine a 10-ft. vein of ore averaging 4% copper and $6 in gold is opened; on the same level another fissure, 4 ft. wide, is being followed, which shows acreage values of 4.5% copper and $8 in gold.

JUAB COUNTY.

(*From Our Special Correspondent.*)

*Tintic Shipments.*—For the week ending May 7 shipments aggregated 130 carloads, as follows: Ajax, 4; Bullion-Beck, 5; Carisa, 5; Centennial-Eureka, 54; Dragon Iron, 9; Eureka Hill, 5; Gemini, 17; Grand Central, 17; Lower Mammoth, 1; Mammoth, 3; South Swansea, 3; Yankee, 2; Uncle Sam, 2; Uncle Sam, concentrates, 3.

*Star Consolidated*—The annual election resulted in a complete change of management. The new officers are: H. G. McMillan, president; J. P. Turner, vice-president; Frank D. Kimball, treasurer, who, with A. C. Ellis and C. F. Packard, complete the new board.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

*Bingham Consolidated.*—Shipments of 181,000 lb. of copper bullion were made during the week ending May 7.

*United States.*—During the week ending May 7 this plant shipped 259,612 lb. of copper bullion.

*Utah Consolidated.*—This company's smelter produced during the week ending April 7 315,000 lb. of copper bullion. The new smelter buildings are expected to be ready for commission about July 1.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

*Honerine*—Additional equipment is being installed that will bring the daily capacity of this plant up to 700 tons. It will soon be ready to do custom work.

*Ophir-Hill.*—This mine and mill at Ophir have been closed indefinitely, throwing out about 150 men. Miners' union dictation is said to be the cause.

*Sacramento.*—This Mercur property shipped $15,000 in quicksilver during the week.

*Stockton Gold Mining & Milling Co.*—Beginning June 1 this company will commence the delivery of 50 tons of ore daily to the Honerine mill at Stockton, paying $1.50 per ton as treatment charges. The Stockton management will soon commence the construction of a water pipe line to Soldier cañon, a distance of 3.5 miles.

## WASHINGTON.

FERRY COUNTY.

*Republic.*—Judge Hanford has ordered the sale of this cyanide mill and other property in default of the payment of $57,760. Foreclosure suit to protect the bonds was heard recently before Judge Hanford in the Federal Court in the case brought by the American Loan & Trust Co., of Boston, representing the bondholders. The defendants are the Republic Power & Cyanide Co., an auxiliary concern to the Republic Consolidated Mining Co., and W. G. Lanskail, trustee of the power corporation.

STEVENS COUNTY.

*Northport.*—This smelter is now running. Extensive repairs on the furnaces have been made and a new sampler and crusher have been installed.

THURSTON COUNTY.

*Great Western Coal Development & Mining Co.*—The new coal-washing plant at Tenino is reported in operation, with a capacity of 400 tons per day. A new haulage system is being put in. A new 500-ton bunker will be put up at once, and a dynamo placed in the power house. The company, it is reported, has about 300 acres near Tenino, has sunk a shaft and uncovered four veins, from 4 to 11 ft. thick. H. G. Langee is president and M. C. Hunter is secretary and treasurer.

## WYOMING.

SHERIDAN COUNTY.

(*From Our Special Correspondent.*)

*Monarch Coal Co.*—This new company, at Monarch, 12 miles west of Sheridan, is marketing 500 tons of coal daily. It controls 2,000 acres of coal land. The work of opening the property started in August, 1903, when there was not even a log shanty within miles. By

January 1 the company had opened up an entry, built houses, a store, tipple, etc. Two seams are known to underlie the property. The one on which the entry is driven is clean lignite, 24 ft. thick. Sixty-five ft. below the first seam lies a second, 18 ft. thick, of as good a quality as the first. Markets are found as far west as Butte and east to Omaha. The tipple is on the main line of the Burlington & Missouri River Railway. Stewart Kennedy, formerly of Pennsylvania, who for four years was interested in the coal company of Dietz, five miles east, is general manager.

## FOREIGN MINING NEWS.

### CANADA.

*Consolidated Lake Superior Co.*—Under the plan of re-organization the new company to be formed by the purchasers of the property will issue $40,000,000 capital stock, $10,000,000 first mortgage 5% bonds, and $3,000,000 income 5% bonds. Of the first mortgage bonds about $8,500,000 will be issued at the present time, and a balance will be retained in the treasury for future issue. Preferred stockholders, who join in the plan, will receive in exchange for 100 shares of old stock an assessment of $3 per share, or $300 in cash, $300 in new income bonds and 50 shares in new stock. Common stockholders will receive in exchange for 100 shares of old stock an assessment of $3 per share, or $300 in cash, $300 in income bonds and 25 shares of new stock. The total distribution will give about $32,000,000 in new stock to the old stockholders, who will also receive the whole of the income bonds. Part of this stock and income bonds issued may, however, go to the underwriters of the plan, representing stock not assented to the plan. The first mortgage bonds will, of course, for the present be subject to the temporary mortgage given to the Ontario government to secure the repayment of its $2,000,000 advanced to the new company.

It is stated that if the plan is promptly accepted, it is possible that the works may be started by June next.

#### BRITISH COLUMBIA—BOUNDARY DISTRICT.

*Boundary Ore Shipments.*—For the week ending April 39 shipments aggregated 12,594 tons, as follows: Granby, 10,140; Mother Lode, 1,664; Emma, 660; Oro Denoro, 130; total for the year, 272,374 tons.

*Paragon.*—Plans are being drawn for an electric drill plant, ore crusher and picking belt for this mine at Boundary. F. S. Ernest, of Spokane, is manager.

#### BRITISH COLUMBIA—NELSON DISTRICT.

*Pilot Gold Mining Co.*—Walter J. Hughes, of Ymir, manager of the Pilot Gold Mining Co., has made arrangement to install a stamp mill on the company's property, which consists of two claims about a mile east of the Foghorn mine.

#### BRITISH COLUMBIA—ROSSLAND DISTRICT.

*Rossland Ore Shipments.*—For the week ending April 30 shipments amounted to 5,020 tons, as follows: Le Roi, 1,287; Centre Star, 1,507; War Eagle, 1,166; Le Roi No. 2, 590, (milled) 280; Spitzee, 90; I. X. L. (milled), 100. Total for the year to date, 137,783 tons.

*Velvet-Portland.*—Machinery for a 25-ton experimental concentrating plant has been purchased for this property on Sophie mountain, near Rossland, by William Thompson, of Rossland, consulting engineer for the company. Water concentration will be used on gold and copper ores. Two Tremaine steam stamps, with a capacity of 25 tons a day, will be used to reduce the ore to 10 or 20-mesh. It will be separated on Overstrom tables. The concentrates will be shipped. The company expects to install a small smelting plant this fall to reduce ores not amenable to water concentration.

*White Bear.*—Work has commenced on the 100-ton concentrator of this company. The management estimates the structure will be finished by July 1, and that the plant will be in operation by September 1. The company has received the 350-h. p. electric motor for the compressor plant. The machine is now being installed and the compressor will soon be working.

## MINING STOCKS.

(Full quotations given on page 789 and 790.)

New York, May 11.

The stock market is dull. In the regular stock trading the prices movement suggests inside purchases. Thus Amalgamated Copper changed hands between $48 and $47.375, notwithstanding the report that the company has quit the political arena in Montana and may soon settle differences with the Heinze interests. Anaconda made sales at $19.06@$18.75. Greene Consolidated, of Mexico, showed a little expansion at $15.875@$15.625. White Knob, of Idaho, moved once at $7.25.

American Smelting & Refining shares moved conservatively, the common selling around $49 and the preferred above $95. On July 1 the company will redeem at par the $191,000 outstanding bonds of the Pueblo Smelting & Refining Co., although they do not mature until 1913.

Ontario Silver, of Utah, appeared at $4.75. Portland, of Cripple Creek, Colo., is weaker at $1.65, while Isabella brought 33c.

The Comstocks are again quiet, Ophir's double dividend not seeming to create any particular interest in these shares. Consolidated California & Virginia held at $1.65, and Mexican at $2. Unusual attention was given to Comstock Tunnel bonds, which sold in large number up at 16.

Another industrial company has discontinued the payment of its regular dividend, although it is claimed earnings would permit another distribution. The Shelby Iron Co., of Alabama, capitalized at $1,000,000, has been paying an average of 13.5% per annum in dividends for the past five years, the last being 5% in November, 1903.

At the annual election of the New York Stock Exchange, on May 9, there was no opposition to the regular ticket, and Mr. H. K. Pomroy was chosen president to succeed Mr. R. H. Thomas.

### Boston. May 10.

*(From Our Special Correspondent.)*

Mining shares, as a rule, are below the prices ranging a week ago. There has been animation in a few stocks, such as Amalgamated, Copper Range and Centennial, but the list has been extremely dull, in sympathy with the general market. The Copper Range report was well received and the stock reflected this sentiment by touching $44.50. At that time it was said that there was considerable changing of Amalgamated into Range on the expectation that the prices of these two would cross. Those making the change, however, have been doomed to disappointment, as Copper Range has settled to $42, while Amalgamated closed to-night at $47.50. It is hinted here that matters are shaping in connection with Amalgamated affairs, which may reflect a better market. Whether it is in connection with Heinze or not cannot be learned.

At present all eyes are turned to Lawson, who is threatening certain Standard Oil people with annihilation. His first movement is to bring suit against Kidder, Peabody & Co. for an accounting in the local gas reorganization. This is interesting because of the fact that there was apparently a general mix-up in gas and Amalgamated Copper affairs.

An up move was made in Centennial late last week which put the price up $1 to $20.75. It was credited largely to the traders. The stock closed to-night at $20. Utah was active for a day or two, with the result that the price reached 34.35. It closed to-night at $33.50. Dominion Iron & Steel rose $2 to $12 on Canadian buying, although small in dimensions. Shannon ran off almost $1 to $7.12½ on liquidating orders, but recovered a part. Now that the Daly West dividend has been cut from 65 to 40c. a month, the stock is in a better position. It sold at $21.50@$22.50, ex-dividend, to-day. Osceola is off $1.25 to $56.25. Directors of this company will take dividend action next month, and $1.50 is expected to be declared. Parrot has dropped $1.75 to $23, and Wolverine is off 50c. to $71. Mohawk has varied from $42.75 to $41.75 and Quincy has declined $1.25 to $80.25. Michigan and Mass mining sell together at $4.

### Colorado Springs. May 6.

*(From Our Special Correspondent.)*

The market in Cripple Creek shares has this week been unsteady and inclined to weakness. During the first part of the week, prices were fairly strong and indications pointed to an active market, but later developments failed to bear out these indications, and the quotations to-day are generally lower than they were a week ago. C., K. & N., and El Paso are exceptions to this rule, as both of these stocks advanced and were strong at the close. Missouri, which enjoyed a sensational advance last week, suffered a decline that was even more rapid than the advance.

The output for the Cripple Creek district for the month of April amounted to $1,850,000, practically $150,000 more than for the previous month. These figures indicate that the camp itself is in excellent condition. As to the market, if statistics count for anything, prices should show in the near future more strength than they do now.

### Salt Lake City. May 7.

*(From Our Special Correspondent.)*

During the week ending May 7 the business transacted on the Salt Lake Stock & Mining exchange amounted to $42,119. The market has been quiet; stocks fluctuated but little. With a few exceptions prices ruled about as they did a week ago. Although the feeling is general that the directors of the Daly West will cut the dividend at their next meeting, the stock has held up remarkably. Shipments continue to come to the smelters from the Grand Central of Tintic. This mine will pay $25,000 in dividends as usual this month. Good reports are coming from the Consolidated Mercur again, and the Moore Process, installed in the mill recently, is giving better results. Tetro is preparing to increase its shipments of ore and the stock closed the week stronger.

### San Francisco. May 5.

*(From Our Special Correspondent.)*

There was a fair market for Ophir during the week, but the rest of the Comstock list was rather quiet, with prices heavy. The trading was largely inside, and it looks very much as if we were dropping down to a chipper's market again for the summer.

Some quotations noted are: Ophir, $6; Mexican, $2.15; Best & Belcher, $1.60; Consolidated California & Virginia, $1.55@$1.60; Hale & Norcross, 65c.; Sierra Nevada, 55c.; Yellow Jacket, 21c.; Crown Point, 18c.

On the San Francisco & Tonopah exchange, business was quiet, and in the absence of buyers the market was very heavy. Montana Tonopah brought $1.50@$1.55; Tonopah Belmont, 69c.; Tonopah Midway, 38s. per share.

On the California exchange, business in oil stocks was rather light, but there was no noteworthy change in prices. Kern River sold for $10.50; Sterling, $2.45; Home, $1.60; Oil City, 45c.; Independence, 24c. The best demand was for the low-priced stocks.

### Monterey. May 4.

*(From Our Special Correspondent.)*

Exchange on New York has dropped from 226.75 to 224.5. The Mexican government has announced 224.05 as the basis for duties during May, and $1,525.90 as the value of one kilo of gold for taxation.

Mining stocks were more active. Victoria, of El Oro, brought $45; Dos Estrellas, $1,725; Borda Antigua, $45; Luz de Borda, $52; Ocotes, $5.50; Equidad, $9; Juanita Oaxaca, $30; Barreno, San Luis Potosi, $70; Augustias, Guanajuato, $40; La Paz, San Luis Potosi, $190, and of Pachuca, Amistad y Concordia, $80; San Rafael, $1,700; Santa Gertrudis, $82; Soledad, $700; Sorpresa, $278; Union, $280; Bartolome, $83, and Blanca y Anexas, $425.

## COAL TRADE REVIEW.

New York, May 11.

#### ANTHRACITE.

The demand for anthracite coal is unusually good for the season, and the prospects are that there will be no abatement for some time yet. Preparations are being made for an active lake

trade, and there is already a number of vessels loaded at Buffalo awaiting dispatch. Unfortunately the wage question is disturbing the lake carriers, and while the debate is on, traffic is delayed. This labor trouble not only affects shipments to the West, but it also has some influence on Canadian business. Meanwhile stocks are accumulating at shipping points, but the expected light ore traffic will give the coal trade the benefit of larger transportation facilities during the season.

Production in April was approximately 5,407,000 tons, making a total of 18,242,537 tons for the four months this year. From January to April last year the shipments were 21,292,006 tons, showing a decrease in 1904 of 3,049,469 tons, or 14.3%. Considering that 1903 was a record year, the smaller returns for 1904 are not alarming, and they compare favorably with the shipments in normal years. There is less inclination to stock the steam sizes at the washeries, and so they are rushed to market as quickly as possible in order to facilitate handling the newly mined coal. Last year, it will be remembered, there was quite an accumulation of steam sizes on the market about this time. Fortunately, these sizes are in better demand now, and, to a certain extent, are taking the place of bituminous coal in the East.

All-rail shipments to western points are small, primarily because the Buffalo section is congested, and many cars are embargoed. In some quarters buyers have to wait for arrivals of coal that should have been delivered during April. Still purchasers are somewhat reconciled by the fact that such receipts in May will not bear the 10c. per ton advance over the April schedule.

Eastern trade is very satisfactory, and it appears that the recent energetic canvass of sales agents in New England territory has borne good fruit. Another encouraging feature is that the railroads are making better effort to improve transportation from mines to tide. New orders at May prices are more frequent, but much of the coal going forward is still at the April schedule.

It is announced that the Interstate Commerce Commission will meet in New York, May 24, for a further hearing on the complaint of W. R. Hearst against the anthracite railroads.

BITUMINOUS.

At the Atlantic seaboard trade continues dull, although a fair quantity of coal has been delivered during the week to consumers. It is evident, however, that consumers are less inclined to lay in large lots, which tends to pile up coal at tidewater shipping ports. Consequently the main line railroads have been quite active in cutting off the car supply at the mines wherever an accumulation of coal at tide has made itself felt. We understand that the embargo from this cause has been general at the Baltimore & Ohio, the Philadelphia & Reading and the Pennsylvania shipping ports.

Discussion continues as regards the new loading and discharging clause in the coastwise vessel market. Some owners and managers of vessels are strictly adhering to their agreement, but there are others who find it necessary, for individual reasons, to charter on the old association bill of lading, especially on vessels under 2,000 tons. It is intimated by shippers that they have been able to pick up a great many outside vessels on association bill of lading terms. On the other hand, with the market becoming more inactive, it looks as if the signers of the agreement will experience difficulty in maintaining their position as the season advances.

Trade in the far East is almost featureless. Reports from there state that shipments during the past week have pretty well filled up consumers' wants, at least for the present. Along Long Island Sound the soft coal trade is feeling the expansion in consumption of anthracite, which is usual at this season. At New York harbor business is quiet, and there is rather a large accumulation of coal at tidewater points. Prices are quoted at $2.35 up for Clearfield grades, f. o. b. New York harbor. The specialties are experiencing some difficulty in booking orders.

All-rail trade does not show much reduction in shipments, as compared with a few weeks ago. Transportation from mines to tide is excellent, coal running through generally in about four days to New York harbor ports, and very little coal is sidetracked. Car supply is limited only by the dispatch given to coal arriving at tidewater.

The coastwise market shows a scarcity of vessels, and rates firm in some quarters. We quote freight rates from Philadelphia as follows: To Boston, Portland and Salem, 90c.; Providence, New Bedford and the Sound, 70c.; Lynn, Newburyport and Gardiner, $1.05; Portsmouth and Bath, 95c.; Saco, $1.10@$1.15; Bangor, $1.10.

---

**Birmingham.** May 9.

(*From Our Special Correspondent.*)

The coal situation, both as to demand and production, holds up well in Alabama. Some of the mines are running slack, their production being made good by new mines starting up. The Blocton mines have been running slow for the past week, caused by a shooting affray among miners. Other mines have been running slow on account of short demand for the product. Among the new mines starting up are those of the Sayre Mining and Manufacturing Co. and the Pratt Coal Co., in the western part of Jefferson county. The Pratt Coal Co. announces that the daily output now is over 4,000, and as soon as the shafts at Banner, on the North Alabama railroad, are in full operation, which will be in six weeks, the aggregate output will be over 6,000 tons.

The increase in miners' wages of 2.5c. on the ton for the month was received with considerable good feeling, the announcement being made on Saturday that iron prices warranted the increased wage. The minimum wage of 47.5c. per ton had been in vogue for several months. The wage is now 50c. per ton.

The official call for the convention of the United Mine Workers of America and the joint convention of miners and operators in June will shortly bring out talk in reference to the new contract. Neither side so far has intimated what will be asked in the new contract, though it is pretty well known that the operators have complaints against the semi-monthly pay day clause and the wages.

The Galloway Coal Company has entered suit against the Central of Georgia Railway Co. for $40,000, claiming debt for coal delivered and for breach of contract made in April, 1903, for a supply of 500 tons per day. The rate made for this coal was $1.40 per ton.

---

**Cleveland.** May 9.

(*From Our Special Correspondent.*)

The coal market in this territory is a little stronger, as a result of a strike which is now prevailing in No. 8 district, in Eastern Ohio. The miners and the operators were in contention about taking up the 'bottom' from machine mining, the operators inserting a clause in the proposed contract, which put that work on the loaders and cutters. The machine men refused and a strike ensued which closed all of the mines, including those which have not yet introduced machinery. This is a steam coal which enters largely into locomotive fuel. The withdrawal of this coal from the market eased the congested conditions materially. Coal had been so abundant in Cleveland and in all lake ports that the railroads were compelled to refuse receipt of further shipments until lake navigation should open. Pittsburg coal, which was weak at $1 at mine, is a little stronger at that price, but does not go above it. The Ohio coal prices are the same.

The lake coal market is as yet inactive because the channels between the lakes are not opened, and because the strife between the masters and pilots and the ship-owners will hardly permit of any movement of boats at the present time. The need for coal in the Northwest is getting very serious and there is a possibility that some of the owners will break over the agreement, pay the scale demanded and get the boats started. The coke situation is still easy, with prices firm at $2.50 for 72-hour coke for foundry use and $1.50 for furnace coke.

---

**Pittsburg.** May 10.

(*From Our Special Correspondent.*)

*Coal.*—A large number of coal mines in this district are idle, owing to the suspension of shipments to lake ports. The railroads announced to-day that shipments will not be resumed before June 1. This will break all records for 24 years. The lake traffic is retarded on account of the unusually severe winter, and unless the strike of longshoremen is soon settled, there may be a further delay. Prices continue weak, and there is no doubt but that better than $1.10 a ton at the mine can be done for run-of-mine coal. About 3,000,000 bush. of coal were shipped to the lower river markets during the week.

*Connellsville Coke.*—There is but little change in the coke trade. Production and shipments show slight gains compared with the previous week. Prices are about the same, furnace coke being quoted at $1.55@$1.60 and foundry at $1.95@$2. Sales of furnace coke at $1.50 are reported. The production last week was 230,841 tons, a gain of 188 tons. The shipments aggregated 10,550 cars, an increase over the previous week of 242 cars. Shipments were distributed as follows: To Pittsburg and river points, 3,730 cars; to points west of Pittsburg, 5,200 cars; to points east of Everson, 1,620 cars.

---

**San Francisco.** May 5.

(*From Our Special Correspondent.*)

Mr. J. W. Harrison's circular, dated May 5, says: "There have been four arrivals of Australian coal; total, 9,285 tons. These cargoes came to hand very opportunely, as the yards here were almost entirely bare of stock. There are 28 coal carriers now engaged for this port, with a carrying capacity of about 73,000 tons, six of these are fully due. Prices remain steady, although there is a slight shading off for late deliveries. Some new grades of Newcastle domestic coal are being imported here, which are being sold prior to arrival guaranteed equal to samples and analyses. The experience of the writer has shown that the promised results from these are seldom realized after practical tests have been made. Shipments from the Northern coast are being freely made, and are offered at prices which it is difficult for colonial coals to compete with, more especially such grades as are utilized for steam purposes. Fuel oil still holds its sway, and is finding ready sale at ruling rates. Our principal railroad companies are confining themselves almost exclusively to the use of oil, each month diminishing their consumption of coal for fuel. The quantity of oil being refined is largely being increased. There is a marked falling off in the demand for house purposes, as warmer weather has put in appearance. It is anticipated that within a short time the brisk competition now existing among our wholesale dealers will be checked, thus assuring them more profitable business."

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coss Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

---

**Foreign Coal Trade.** May 11.

Export trade here continues very quiet. There is nothing new to report.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of April 30 that the market throughout is quiet. Quotations are: Best Welsh steam coal, $4.32; seconds, $4.14; thirds, $3.96; dry coals, $4.02; best Monmouthshire, $3.66; seconds, $3.36; best small steam coal, $1.92; seconds, $1.80; other sorts, $1.44.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The freight market remains about the same, and rates to the Mediterranean remain firm. Some others quoted from Cardiff are: Marseilles, $1.50; Genoa, $1.50; Naples, $1.56; Las Palmas, $1.50; St. Vincent, $1.62; Rio, $2.28; Santos, $2.64; Buenos Aires, $1.98.

## IRON TRADE REVIEW.

New York, May 11.

The iron trade continues quiet, and business has been confined, for the most part, to small orders for quick delivery. Buyers are evidently determined to make no large commitments at the present time, until the future course of business is better defined. In pig iron there are rumors of shading prices to secure business, but, as is usually the case, it is difficult to trace such rumors to a definite origin. There is no doubt, however, that pig iron has sold on a slightly lower basis. There seems to be little doubt also that billets have been sold below the Association price. The most notable instance is a large order placed by the Alabama Steel & Iron Co. with a western Pennsylvania concern.

In finished material the same condition prevails. A little more business in bars is reported, but in other lines there is comparatively little doing. Orders for structural steel and for rails continue on a very limited scale, and the business in both is only such as is required for immediate necessities of buyers.

The break-up of the Ore Association has had no special effect. It has been pretty well understood that the reduction of prices of lake ores would come, either through the action of the Association or through an open market.

*Steel Rail Production.*—The *Bulletin* of the American Iron & Steel Association says, under date of May 10: "In our issue for April 10 we gave the production of bessemer steel rails in 1903 by the producers of bessemer ingots as amounting to 2,813,583 gross tons, showing a decrease of 62,710 tons as compared with the production of 1902. The total for 1903 was correctly obtained from the detailed production of the rail-making companies as it had been reported to us. There was no error in our bookkeeping. But there was a grave error elsewhere. In a table accompanying the statistics for 1903 we gave the production of bessemer steel rails by the Edgar Thomson Steel Works of the Carnegie Steel Co. in that year as amounting to 675,214 tons, or exactly 34.692 tons less than their production in 1902. Here is where the error in our total for 1903 crept in. The actual production by the Edgar Thomson Steel Works in that year was 734,859 tons, and not 675,214 tons, as officially reported to us, or exactly 59,645 tons more than had been reported, and exactly 24,953 tons more than their production in 1902, making 1903 and not 1902 the year of maximum production of rails by these works.

"Correcting the error in our table of the total production of bessemer steel rails by the producers of bessemer steel ingots in 1903, which the corrected figures of the Edgar Thomson works make necessary, gives us a total for that year of 2,873,288 tons, or only 3,065 tons less than the production of 1902, instead of 62,710 tons less, as previously stated."

---

**Birmingham.** May 9.

*(From Our Special Correspondent.)*

The Southern pig iron market is steady, with a fairly good demand being received, notwithstanding intimations that quietness was about to set in. Inquiries received indicate that the consumers are making efforts to beat down prices again, but the Southern manufacturers are in a position to hold firm to quotations and expect their sales to be active through the balance of the year. No. 2 foundry iron is being held firm at $10 per ton, with sales made at $10.25.

The investigation of the sales books of the Tennesse Coal, Iron & Railroad Co. and the Sloss-Sheffield Steel & Iron Co. by the committees of the United Mine Workers to ascertain the average price of iron, so that the mining wage for the month might be fixed, showed the iron prices were improved, and the miners received an advance in their wage.

The following iron quotations are given: No. 1 foundry, $10.50; No. 2 foundry, $10@$10.50; No. 3 foundry, $9.75@$10; No. 4 foundry, $9.50 @$9.75; gray forge, $9@$9.50; No. 1 soft, $10.50; No. 2 soft, $10@$10.50.

The Sloss-Sheffield Steel & Iron Co. will begin selling iron again towards the end of the month. It was believed that this company would be in the market by this time, but in a conversation with President J. C. Maben, it was learned that the Sloss-Sheffield is not yet anxious to sell much iron for future delivery.

There is no complaint to be made as to the amount of iron being turned out. The Sloss-Sheffield Co., with six of its seven furnaces in operation, manufactured over 35,000 tons of iron during the month of April.

The steel plant of the Tennessee Co. at Ensley is in steady operation. The steel rod, wire and nail mills of the Alabama Steel & Wire Co. at Ensley lost three or four days during the past week on account of a shortage in water supply. Arrangements were made for water to be furnished by the Birmingham Water Company. The plant resumed operations this week. The Alabama Co.'s steel plant at Gadsden is nearing completion.

The cast-iron pipe manufacturers in the Southern territory continue to enjoy prosperous conditions. With the exception of one pit of the United States Co.'s plant in Bessemer, all plants in the Birmingham district have been running steadily. There is no change in the finished iron and steel market.

---

**Cleveland.** May 10.

*(From Our Special Correspondent.)*

*Iron Ore.*—The Ore Association having disbanded for this year, and there being no agreement as to ore prices, the market is beginning to adjust itself. Some sales of ore have already been made, both for the current year and on long-time contracts, and it is intimated that the sales to date will about cover the needs for this year. The prices, which were recently established by a partial agreement among the members of the Ore Association, have been disregarded, in the main. The first sales were of bessemer Mesabi, and the price was $3.25 per ton, f. o. b. Lake Erie ports; but the selling price has ranged between $2.75 and $3, most of the sales being at the latter price. No bessemer old-range has been sold for less than $3.50, but the engagements in that ore are small. The market does not show any disposition to deviate from the price recently partially agreed upon among producers for non-bessemer ores. The non-bessemer old-range, for instance, was to sell at $2.85 and the non-bessemer Mesabi at $2.65. These prices have prevailed upon such sales as have been made, with the possible exception of a few reductions on the Mesabi. Lake conditions make it inexpedient that there should have been any charters for the delivery of ore. The result is that the market is still lifeless.

*Pig Iron.*—The market is dull. Foundry iron moves erratically for present consumption and not at all for future consumption. The market does not have much iron to offer for sale, but what is offered is not taken up very speedily. The inquiries for second half delivery all indicate that there is a belief that prices will be much lower. Current prices on foundry are $13.25@$13.50 for No. 2 for spot shipment, and $12.50@$13 Valley furnace, for second half. Bessemer and basic are dead.

*Finished Material.*—The market during the past week has not been buoyant. No demand has been made for a reduction of prices because of the promised readjustment growing out of the dissolution of the Ore Association. It is apparent, however, that the trade is waiting for some such development which may be expected in a very short time. The bar situation alone has been indicative. Bar iron is not in strong demand and the low prices of scrap is helping the prices down, with a report that a cut of $1 a ton has been made. In bar steel the mills are disregarding the Pittsburg basis and are quoting 1.35 at the mill for bessemer. The plate and structural market has been easy and trading has been narrow. The prices hold at 1.60c. Pittsburg. In sheets the trade is not picking up. The weather conditions seem to have played havoc with this trade, not only for the present but for the year. This applies especially to galvanized sheets, where the demand has been uncommonly light. The market has been sold off by some of the smaller mills, which are still accepting prices from $1 to $3 under the schedule. The talk is, too, that the price of billets has been cut $1 to $2 below the association price of $23.50, Cleveland.

*Old Material.*—The scrap market has been very dull and prices have been inclined downward.

---

**New York.** May 11.

*Pig Iron.*—The local market has been very dull. There are still reports of concessions in prices, but these are a little doubtful, as there are no orders on the market of sufficient size to induce cutting. Business seems to be based entirely on immediate requirements. Northern iron is a shade easier for No. 1 X, which can be had at $15.25@$15.50; other prices are unchanged, as follows: No. 2 X foundry, $15@ $15.25; No. 2 plain, $14.50@$14.75; gray forge can be had around $14. For southern iron on dock quotations are: No. 1 foundry, $14@ $14.25; No. 2 foundry, $13.50@$13.75; No. 3 foundry, $13@$13.25; gray forge has been offered at $12.75. No. 1 soft is now bringing about $14@$14.25, and No. 2 soft, $13.50@ $13.75.

*Bar Iron and Steel.*—The trade is quiet, but with no material change in prices. Refined bars are quoted at 1.495c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c.

*Plates.*—The market is still dull, with orders confined to small lots. Sheared plates are quoted as follows: Tank, 1.25-in. and heavier, 1.75@ 1.85c.; flange, 1.85@2c.; marine, 2@2.10c.

*Structural Material.*—The market is dull, and only small orders are noted. Large lots at tidewater are still quoted at 1.75@2c. for beams, angles and channels.

*Steel Rails.*—Nothing is doing in standard rails, but there is some call for girder rails for electric roads. Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

---

**Philadelphia.** May 11.

*(From Our Special Correspondent.)*

*Pig Iron.*—The pig iron market is in an unsatisfactory condition, on account of the prevalence of rumors relating to possible shadings on steel pig, which is having its effect on foundry and forge irons. Our leading brokers admit that they are without important inquiries this week, and also claim that concessions are out of the question, considering present cost. We are still having some trouble with Alabama iron, which is offered at prices that cut us out of some business. Fortunately, the consumption of all kinds of iron continues unabated. The only discouraging feature is that those larger consumers, who are seriously considering the placing of orders for later delivery, have been dissuaded from present action. Quotations may be given at $15.75@$16 for No. 1 X; some No. 2 X sold to-day at $15; No. 2 plain is held as high as $15, though $14.50 is nearer its market value. No. 2 southern is being offered at $14.25; gray forge, $14; basic, $14.

*Billets.*—The same influences have served to retard the closing of some promising business in steel billets. Rumors are repeated that steel billets are being quietly sold below the prices ruling last week. These rumors cannot be traced to any source. The larger consumers have an arrangement by which they profit by any weakening, but the smaller concerns on the outside are unable to make satisfactory arrangements and therefore what little buying they do is simply to keep them going. The standard quotations of $23 at mill are still given.

*Merchant Bar.*—The bar situation continues satisfactory and the retail trade is all that could be expected both at mill and store. We are using up a great deal of bar and there are inquiries on the market this week for car-building material which calls for common iron, and the bidding is very close.

*Sheets.*—The sheet situation might be better, and would be better if the mill people would accept such a shading as large consumers are prepared to offer for deliveries during the third quarter of the year. The sales from store are quite satisfactory for the season.

*Merchant Steel.*—All lines of merchant steel are strong in the retail trade. Large lots are not being ordered.

*Pipes and Tubes.*—Pipes and tubes are selling slowly, not through any decrease in consumption, but largely because most of our larger consumers are pretty well covered for some time to come. The inquiries which agents have received recently are from parties who are supplied, but who are watching the market very closely to take advantage of any terms that may be offered to secure late deliveries at easy prices.

*Plates.*—There is an improvement in plates in small lots, for boiler plate particularly, the consumption of which appears to be increasing owing to a good deal of work for quick delivery. Several small purchases of steel tank have just been made and there are other inquiries under consideration. Steel tank ¼-in., is quoted at 1.78½; thicker ranges from 1.88½@2.03½c.

*Structural Material.*—Quite a number of trifling orders have been sent to the mills this week for early execution. The structural people are not able to give a very encouraging report so far as big work is concerned. Beams, channels and angles are quoted at 1.73@1.85.

*Old Rails.*—A good many old iron rails could be disposed of at this time, if something like $17.50 were taken, but such figures will not be entertained.

*Scrap.*—Scrap continues to weaken, but the quotations do not show any falling off. The larger consumers liberally provided themselves with supplies a month or more ago, but the market hardened on them and they have since been doing nothing. The condition is in favor of buyers, but the scrap men refuse to yield, and the best offers at which they are willing to furnish No. 1 steel scrap this week is $14; old iron axles are quoted nominally at $21.50; old steel axles, $18.50; best railroad scrap is being handled at about $17.50; and machinery scrap is occasionally picked up at $13.25 per ton.

---

**Pittsburg.** May 10.

(*From Our Special Correspondent.*)

The pig iron market continues quiet, but the outlook seems a trifle brighter than a week ago. Enquiries for bessemer iron aggregating about 4,000 tons were received within the past few days. They were for small lots of from 100 to 300 tons, indicating that consumers are only buying for immediate requirements. The furnaces are still operating, and there is no likelihood of a curtailment of production for some time. The monthly report of J. G. Butler, Jr., chairman of the Bessemer Pig Iron Association, shows that on May 1, of 165 furnaces using Lake Superior ores, there were 130 stacks in blast and 35 out of blast. The percentage of active capacity was 89.5 and the idle capacity 10.5. The total daily capacity of the 165 furnaces is 47,780 tons. The percentages of idle capacity during the year are as follows: January 1, 64.5%; February 1, 38%; March 1, 28%; April 1, 14.5% and May 1, 10.5%. Prices have not changed since the quotations of a week ago and it is said by some interests that the bottom has been reached. Despite the disturbed condition of the pig iron market, the workers are considering the advisability of making demands. On Saturday President McMahon, of the National Association of Blast Furnace Workers & Smelters, called a meeting of the executive board for to-day in Cleveland. It is reported that the question of asking for a restoration of the recent reduction will be considered.

In finished lines there is still some activity in pipe, tin-plate and wire products and there is a little new business in almost every other line. Consumers, however, are not contracting ahead, merely buying for most urgent requirements. Prices in all lines are firm, and no shading is reported in any branch of the steel industry. One large interest yesterday sold 2,000 tons of bessemer steel billets at $23, the association price. The report of a cut in billet prices may have emanated from a sale of 6,000 tons by a leading producer in this district to an independent wire interest at Gadsden, Ala., at a delivered price of $25.25. The freight from the Pittsburg district to Alabama is $4.65, leaving the producer $20.60 at the works. This is not considered a cut, as it is the full association price for the point of delivery. There is an unconfirmed rumor that a Monessen consumer has just been quoted a price of $22. The representative of a large steel interest declared positively to-day that he is certain no cutting is being done. The wire mills are behind in deliveries, but succeeded during the week in catching up some. New orders for steel rails amounting to nearly 100,000 tons have been received during the past week, the bulk going to the Lackawanna Steel Co. Some railroads are still endeavoring to obtain a concession in prices. The president of an Eastern road is credited with having made a statement that orders for 1,200,000 tons of rails would be immediately placed if the railmakers would cut the price to $26.

President W. T. Graham, of the American Sheet & Tin-Plate Co., has notified the Amalgamated Association of Iron, Steel & Tin Workers that the collections for the rebate fund would be suspended on June 1. The announcement was made at the annual convention being held in Cleveland and caused considerable surprise, as the delegates had been instructed to urge the cancellation of the agreement. The suspension of the collections brought out the interesting statement that the company now has orders covering the entire amount in the rebate fund. About two weeks ago it was given out by President Shaffer, of the Amalgamated Association, that there was $67,000 in the fund, and by June 1, when collections will stop, it is fair to presume there will be fully $70,000 to be drawn on by the American Co. for its rebate trade. Officers of the company decline to give any information as to the extent of this business, but an independent producer figured out to-day that if the company has orders for the entire amount in the rebate fund it has sold fully 500,000 boxes. Under the arrangement the American Co. received 25% of the labor cost for every box of tin-plate that goes into the rebate trade.

*Pig Iron.*—The market is quiet as to sales, but prices have not declined since the last report. Inquiries are being received daily for small lots, and the lowest price quoted so far has been $12.75, Valley, for bessemer; $13.60@$13.75, Pittsburg, for foundry No. 2, and $12.75@$13, Pittsburg, for gray forge.

*Steel.*—One sale of 2,000 tons of bessemer billets has just been made at the association price of $23. One interest has sold 6,000 tons to an Alabama wire interest at a delivered price of $25.25. The structural material, steel bar and plate markets are very quiet. Steel bars are quoted at 1.35c. and plates at 1.60c. A meeting of the plate association is scheduled for New York to-day.

*Sheets.*—There is some business in sheets, but prices remain very low. The leading interest continues to quote No. 28 gauge black sheets at 2.30c. and galvanized at 3.30c.; but it is reported that independents have sold at 2.20 and 2.25c.

*Ferro-Manganese.*—The market is quiet and 80% domestic is quoted this week at $41.50, and this price could be shaded on a large order.

---

**Cartagena, Spain.** April 23.

(*Special Report of Barrington & Holt.*)

*Iron and Manganiferous Ores.*—Shipments reported include two cargoes, 4,900 tons dry ore and one cargo, 3,750 tons manganiferous ore, all to Great Britain. There is a fair inquiry for ore and a tendency to ask higher prices. Miners are increasing their output, but transportation has been delayed by bad roads.

Current quotations for iron ore are: Ordinary 50% ore, 6s. 6d.@6s. 9d.; special low phosphorous, 7s.@7s. 6d.; specular ore, 58% iron, 9s.; magnetic ore, 60% 11s. 3d. for lumps and 9s. 3d. for smalls. Manganiferous ores range from 14s. 3d for 20% iron and 20% manganese down to 9s. 6d. for 35% iron and 12% manganese.

*Pyrites.*—Iron pyrites, 40% iron and 43% sulphur, are quoted at 10s. 3d. per ton. Exports for the week were 210 tons to Marseilles.

---

## CHEMICALS AND MINERALS.

NEW YORK, May 11.

Better prospects confront the trade, and, in heavy chemicals especially, there has been a marked improvement in deliveries. In the more important lines prices are somewhat easier, owing to free selling by second hands.

Advices from Great Britain intimate that April was a rather unsatisfactory month in the chemical trade, disappointment having been felt in the home demand and in certain export quarters. However, hopes are entertained for an improvement with the commercial situation, which has begun to brighten some.

*Cyanide.*—Nothing of interest can be reported, and the quotation of 19@20c. per lb. is still the market range.

*Bleaching Powder.*—Aside from the jobbers' sales at fractionally less than importers' prices, the market is quiet. Prime British and American grades are quoted at $1.25 per 100 lb., and Continental $1.20@$1.25. Lower grades may be had at less.

*Copper Sulphate.*—Second-hands are practically in control of the transient market, and unhesitatingly quote from 5 to 10c. per 100 lb. less than makers, whose price, $5.05@$5.10, is nominal, as they have little unsold stock on hand.

*Acids.*—Contract deliveries are expanding, and the warmer weather has brought out more urgent inquiry from the soda-water trade. Prices continue unchanged.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

| | | | |
|---|---|---|---|
| Muriatic, 18° | $1.50 | Oxalic, com'l. | $5.10@$5.50 |
| Muriatic, 20° | 1.60 | Sulphuric, 50°, bulk, ton | 13.50@14.50 |
| Muriatic, 22° | 1.75 | Sulphuric, 60°, bulk, ton | 18.00@20.00 |
| Nitric, 36° | 4.50 | Sulphuric, 66°, bulk, ton | 21.00@23.00 |
| Nitric, 38° | 4.75 | | |
| Nitric, 40° | 5.00 | | |
| Nitric, 42° | 5.50 | | |

*Brimstone.*—Ex-dock lots have sold at $22 per ton, while shipments command $21.75@$22 for best unmixed seconds, and about 50c. less for thirds.

*Pyrites.*—Spanish charters are being booked at higher rates, the last being at 9s. 6d.@10s. ($2.28@$2.40). Demand from consumers is not up to last year, although prices are easier. Apparently this year's consumption will show a decrease.

We quote domestic pyrites $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 9c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@11.5c. per unit for lump, and 9.5@10c. for fines, delivered at Atlantic ports.

*Nitrate of Soda.*—Arrivals are being quickly taken up, as consumption continues good. Quotations are unchanged at $2.30 per 100 lb. for spot, $2.25 for May arrivals, $2.20 June, $2.05@$2.125 for July to December.

The New Paccha & Jazpampa Nitrate Co. has declared a bonus dividend of 14% on the preferred stock, making 22% for the year 1903, in addition to 7% paid on the ordinary shares.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, May 1, gives the following interesting statistics, in tons:

| | 1904. | 1903. |
|---|---|---|
| Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1904 to date, | 94,114 | 71,353 |
| From Europe | ..... | ..... |
| Stock in store and afloat May 1, 1904, in New York | 3,400 | 1,016 |
| To arrive, due Aug. 15, 1904 | 62,500 | 60,760 |
| Visible supply to Aug. 15, 1904 | 68,600 | 63,243 |
| Stock on hand Jan. 1, 1904 | 8,100 | 7,800 |
| Deliveries past month | 16,453 | 22,885 |
| Deliveries since Jan. 1 to date | 96,114 | 76,670 |
| Total yearly deliveries | ..... | 229,589 |
| Prices current, May 1 | 2¼. | 2.05c. |

Deliveries during the past four months show an increase of 19,444 tons, or about 25 per cent.

*Chilean Nitrate of Soda Market.*—Messrs. Jackson Bros., of Valparaiso, write under date of March 30 as follows: There has been very little interest shown by exporters to operate, and while producers are not free sellers, most of them ask 6s. 11d. alongside for any delivery this year. Sales have been effected at 6s. 10d. alongside for July-December, and 6s. 10½d. has been accepted for April-May. In the refined quality transactions have been made for May at 7s. 4½d. alongside and for September-October delivery at 7s. 3d. alongside. The production for January and February was 4,503,389 qtl., against 4,797,787 qtl. last year. We quote 95% April-May, 6s. 10½d., June-December, 6s. 11d. and for 96% April-May, 7s. 5d., August-October, 7s. 3d., all alongside terms. The price of 6s. 10s. with an all round freight of 17s. 6d. stands

in 8s. 5¾d. per cwt. net cost and freight, without purchasing commission. Reported sales for the fortnight were 170,000 qtl., and re-sales 91,000 qtl.

*Sulphate of Ammonia.*—Inactive. Gas liquor is quoted $3.05@$3.10 per 100 pounds.

*Phosphates.*—A few more Continental orders for 1905 delivery have been booked by miners at about current quotations, but the quantity is necessarily limited, owing to the reluctance of exporters to extend present prices so far ahead. From all indications the next 12 months will show a material change in the statistical and financial situation of the industry, particularly in Florida, and if present plans are not interrupted, profits in mining will be much larger than they have been of late. Economy in railroad rates from mines to shipping ports on lines operated by mining companies that are large exporters, is, perhaps, the most important factor that is enforcing a change in railroad policy, and lower freight rates. Certainly the chartering of new independent railways in Florida is proof that the transportation question may be solved to the benefit of miners.

In South Carolina, river mining has received another blow by the phosphate commissioners, who have refused the Central Phosphate Co. a reduction in royalty from 25c. to 12.5c. This company contemplates working marsh land.

| Phosphates. | F. o. b. | C. 1. f. Gt. Britain or Europe. |
|---|---|---|
| *Fla. hard rock, 77@80%.... | $7.00@$7.25 | $10.07@11.63 |
| land pebble, 68@73%.. | 3.75@ 4.00 | 7.35@ 8.05 |
| †Tenn. 78@80%..... | 4.00@ 4.25 | 9.88@10.66 |
| 78% ..... | 3.75@ 4.00 | ..... |
| 75% ..... | 3.25@ 3.50 | ..... |
| 73@74% ..... | 2.95@ 3.20 | ..... |
| ‡So. Car. land rock..... | 3.25@ 3.50 | ..... |
| river rock, 55@60%. | 3.00@ 3.25 | 5.75@ 6.56 |
| Algerian 63@70% ..... | .... | 6.82@ 7.32 |
| 58@63% ..... | .... | 6.05@ 6.50 |
| 53@58% ..... | .... | 4.95@ 5.00 |
| Tunis (Gafsa) ..... | .... | 5.75@ 6.50 |
| Christmas Isle, 80@85%..... | .... | 11.75@12.54 |
| Ocean Isle, 82@88%..... | .... | 12.54@12.98 |
| Somme, Fr., 70@75%..... | .... | 10.63@11.02 |
| Bordeaux, Fr., 60@65%..... | .... | 7.60@ 7.72 |
| 55@60% .... | .... | 6.44@ 6.55 |
| Liege, Bel., 60@65%..... | .... | 7.00@ 7.10 |

* F. o. b. Florida or Georgia ports. † F. o. b. Mt. Pleasant. ‡ On vessel, Ashley River, S. C.

**Liverpool.** April 27.

(*Special Report Jos. P. Brunner & Co.*)

For the ordinary lines of heavy chemicals the market is quietly steady.

Soda ash is firm. For tierces the nearest values are about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton, net cash; Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. per ton, net cash; Bags, 5s. per ton under price for tierces. Soda crystals are in good jobbing demand at generally £3 7s. 6d. per ton, less 5%, for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is in steady request, but without any special activity. Quotations are unchanged as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other export quarters.

Bleaching powder is rather slow of sale at £4 5s.@£4 10s. per ton, net cash, for hardwood packages, as to market.

Chlorate of potash continues dull and at about 2⅜@2½d. per lb., net cash, for English make.

Bicarbonate of soda is selling at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is flat and lower at £12 10s.@£12 12s. 6d. per ton, less 2½%, for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda, owing to spot supplies being almost exhausted, has been rather excited during the past few days, and for immediate requirements as much as 10s. per ton advance has been paid over quotations named in our last. To-day, with a steamer arrival of 1,000 tons, the market has eased for the moment, and £10 7s. 6d.@£10 12s. 6d. per ton, less 2½% is quoted for double bags f. o. b. here, as to quality. This parcel will probably be quickly cleared and unless some of the delayed cargoes come quickly to hand, a further stringency and upward movement in prices seems not unlikely.

## METAL MARKET.

New York, May 11.

### Gold and Silver Exports and Imports,

At all United States Ports in March and Year.

| Metal | March. | | Year. | |
|---|---|---|---|---|
| | 1903. | 1904. | 1903. | 1904. |
| Gold: | | | | |
| Exports. | $1,042,598 | $3,062,747 | $2,634,919 | $4,386,928 |
| Imports. | 4,567,728 | 8,855,760 | 8,394,035 | 22,115,640 |
| Excess | I. $3,525,130 | I. $5,793,013 | I. $5,761,116 | I. $17,728,712 |
| Silver: | | | | |
| Exports. | 3,664,660 | 4,110,053 | 11,109,045 | 12,675,249 |
| Imports. | 1,478,771 | 2,108,386 | 4,660,334 | 6,824,403 |
| Excess | E. $2,185,889 | E. $2,001,667 | E. $6,448,711 | E. $5,850,84 |

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

### Gold and Silver Exports and Imports, New York.

For the week ending April 30 and for years from January 1.

| Period. | Gold. | | Silver. | |
|---|---|---|---|---|
| | Exports. | Imports. | Exports. | Imports. |
| Week ..... | $9,300,263 | $107,774 | $265,785 | $ 3,688 |
| 1904..... | 3,484,556 | 1,751,980 | 15,128,135 | 274,464 |
| 1903..... | 2,381,450 | 2,754,502 | 6,222,100 | 699,901 |
| 1902..... | 16,443,101 | 1,033,322 | 11,141,607 | 470,973 |

Gold exports went chiefly to Cherburg and Havre, and silver to London.

General business remains quiet, and the speculative markets have been dull. The Panama Canal payment has been formally made, and shipments of gold to Paris continue, presumably to meet the Treasury draft for $40,000,000. The exports so far this week have been about $17,000,000. Some gold is arriving at San Francisco from Japan.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending May 7, gives the following totals, comparisons being made with the corresponding week of 1903:

| | 1903. | 1904. |
|---|---|---|
| Loans and discounts..... | $923,080,200 | $1,071,030,000 |
| Deposits ..... | 915,834,700 | 1,131,712,800 |
| Circulation ..... | 43,948,900 | 35,774,600 |
| Specie ..... | 169,051,700 | 230,610,900 |
| Legal tenders ..... | 69,936,800 | 75,041,500 |
| Total reserve ..... | $288,988,500 | $305,652,400 |
| Legal requirements..... | 228,958,675 | 282,928,200 |
| Balance surplus..... | $10,029,825 | $22,724,200 |

Changes for the week this year were increases of $21,393,200 in loans and discounts, $17,345,000 in deposits and $5,900 in circulation; decrease of $4,585,600 in specie, $1,498,200 in legal tenders and $10,420,050 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

| | 1903. | | 1904. | |
|---|---|---|---|---|
| | Gold. | Silver. | Gold. | Silver. |
| N. Y. Ass'd— | $169,051,700 | ..... | $230,610,900 | ..... |
| England— | 176,790,810 | ..... | 169,109,600 | ..... |
| France— | 498,903,000 | $222,301,980 | 496,073,135 | $223,640,505 |
| Germany— | 161,825,000 | 56,860,000 | 168,280,000 | 59,125,000 |
| Spain— | 72,480,000 | 101,775,000 | 73,380,000 | 99,380,000 |
| Netherlands— | 19,674,500 | 32,668,500 | 27,281,500 | 32,819,500 |
| Belgium— | 15,223,335 | 7,611,665 | 14,973,335 | 7,486,665 |
| Italy— | 88,495,000 | 11,332,000 | 110,300,000 | 19,099,000 |
| Russia— | 377,360,000 | 40,365,000 | 427,990,000 | 42,090,000 |
| Austria— | 229,525,000 | 65,440,000 | 235,695,000 | 64,545,000 |

The returns of the Associated Banks of New York are of date of May 7, and the others May 5, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market is steady and shows a disposition to advance. Apparently the Eastern situation is responsible for the special inquiry. Shipments have been large and output has been easily absorbed.

The United States Assay Office in New York reports receipts of 42,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to April 28 are reported by Messrs. Pixley & Abell's circular as follows:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| India ..... | £2,585,500 | £3,945,789 | I. £1,360,289 |
| China ..... | 138,081 | 71,000 | D. 67,081 |
| Straits ..... | 148,391 | 58,103 | D. 90,288 |
| | £2,871,972 | £4,074,892 | I. £1,202,920 |

Receipts for the week this year were £117,000 in bar silver from New York, £5,000 from Australia, and £3,000 from the Suez; total, £125,000. Shipments were £49,000 in bar silver to Bombay and £48,000 to Calcutta; total, £97,000.

Indian exchange was somewhat stronger. The demand for council bills in London was good, and all those offered were taken at an average of16.03d. per rupee. There has been some further shipment of gold from Australia to India, chiefly for account of the currency department. Buying of silver for Indian account has been a little more active than for several weeks past.

### Prices of Foreign Coins.

| | Bid. | Asked |
|---|---|---|
| Mexican dollars..... | $0.44¼ | $0.46½ |
| Peruvian soles and Chinese pesos..... | .39½ | .43 |
| Victoria sovereigns..... | 4.85⅞ | 4.87 |
| Twenty francs..... | 3.86 | 3.88 |
| Spanish 25 pesetas..... | 4.78 | 4.82 |

## OTHER METALS.

### Daily Prices of Metals in New York.

| May | Silver— New York Cts. | Silver— London, Pence. | Copper— Lake, Cts. per lb. | Copper— Electrolytic, Cts. per lb. | Copper— London, £ per ton. | Tin, Cts. per lb. | Lead, Cts. per lb. | Spelter— N. Y., Cts. per lb. | Spelter— St. Louis, Cts. per lb. |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 54⅝ | 25 7/16 | 13 @13¼ | 12¾ @13 | 58¼ | 27⅞ | 4.45 @4.50 | 5.17½ | 5.00 |
| 6 | 55⅛ | 25 7/16 | 13 @13¼ | 12¾ @13 | 58⅛ | 27⅞ | 4.45 @4.50 | 5.17½ | 5.00 |
| 7 | 55¼ | 25⅛ | 13 @13¼ | 12¾ @13 | .... | 27⅞ | 4.45 @4.50 | 5.17½ | 5.00 |
| 9 | 56 | 25 13/16 | 13 @13¼ | 12¾ @13 | 57⅝ | 27¾ @27⅞ | 4.45 @4.50 | 5.17½ | 5.00 |
| 10 | 56 | 25⅞ | 13 @13¼ | 12¾ @13 | 57¾ | 27⅞ @27⅞ | 4.45 @4.50 | 5.17½ | 5.00 |
| 11 | 55⅞ | 25¾ | 13 @13¼ | 12¾ @13 | 57½ | 27⅞ @27¾ | 4.45 @4 50 | 5.17½ | 5.00 |

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

QUOTATIONS ON STERLING EXCHANGE.

| | | | | | |
|---|---|---|---|---|---|
| May | 5..... | 4.86⅞ | May | 9..... | 4.86⅞ |
| " | 6..... | 4.86⅞ | " | 10 ..... | 4.86⅞ |
| " | 7..... | 4.86⅞ | " | 11..... | 4.86⅞ |

*Copper.*—Dullness has reigned supreme through the week, and nothing of interest has transpired, both consumers and producers assuming a waiting attitude. The closing quotations are given as 13@13¼c. for Lake copper; 12¾@13c. for electrolytic in ingots, cakes and wirebars; 12½@12¾c. in cathodes; 12½@12⅝c. for casting copper.

The market for standard copper in London, which closed last week at £58 2s. 6d., opened on Monday at £57 12s. 6d., and the closing quotations on Wednesday are cabled as £57 10s.@

£57 11s. 3d. for spot, £57 12s. 6d.@£57 13s. 9d. for three months.

Refined and manufactured sorts we quote: English tough, £62@£62 5s.; best selected, £63 @£63 5s.; strong sheets, £73@£74; India sheets, £71@£71 10s.; yellow metal, 6⅜d.@6½d.

Exports of copper from Baltimore for the week ending May 10 are reported by our special correspondent at 1,882 tons to Hamburg and Rotterdam. There were no imports.

*Tin* ruled steady at about 27⅞ during the latter part of last week; on Tuesday, however, the market dropped sharply to 27½. The close is somewhat firmer at 27⅝@27¾ for spot, 27⅞ @27½ for futures.

The foreign market, which closed last week at £127 7s. 6d., open on Monday at £126, declined on Tuesday to £124 15s., and the closing quotations on Wednesday are cabled as £125 2s. 6d.@£125 5s. for spot, £124 2s. 6d.@£124 5s. for three months.

*Lead* remains dull and unchanged. The ruling quotations are 4.45@4.50 New York; 4.37½ @4.42½ St. Louis.

The foreign market is steady, Spanish lead being quoted at £11 17s. 6d.@£11 18s. 9d.; English lead at £12@£12 1s. 3d.

*Spanish Lead Market.*—Messrs. Barrington & Holt report from Cartagena, Spain, under date of April 23, that the price of silver during the week has been 13.50 reales per oz. Exchange is lower, being 34.87 pesetas to £1. The quotation for pig lead on wharf has been 69.75 reales per quintal, which, on current exchange, is equal to £11 3s. 9d. per long ton, f. o. b. Cartagena. Exports were 9,612 kg. pig lead, 100,000 kg. desilverized lead and 766 kg. bar silver, all to Marseilles.

*Spelter* has ruled very dull throughout the week and transactions have been few and far between. The ruling quotations are 5c. St. Louis, 5.17½c. New York.

The foreign market is steady, good ordinaries being quoted at £22 7s. 6d., specials at £22 12s. 6d.

*Silesian Spelter Market.*—According to information furnished by Paul Speier, under date of April 30, the market for spelter has been large and at very good prices. The smelters have been fully occupied, and there are no stocks on hand worthy of consideration. Quotations are 22.25@22.50 marks per 50 kg. f. o. b. cars at Stettin; this is equivalent to 4.80@4.86c. per lb. The firmness of the market at present is due to the strong demand from England, to which country the exports during the month of March amounted to 8,682 tons, as compared with 6,653 tons in 1903. Statistics, which have just been completed, show that the consumption of zinc in Germany during 1903 aggregated 182,548 tons, an increase of 7,621 tons over the figures for the preceding year. The increase in prices of spelter has not been followed by a corresponding increase in the quotations for sheet zinc, and the difference between the quotations for the two products is considerably less now than in the preceding year. During the last two weeks there has been a strong call for zinc dust from both domestic and foreign consumers. Prices have an upward tendency, the last quotations being 42@42.50 marks per 100 kg. in lots of 10 tons or more, f. o. b. Stettin.

*Spanish Zinc Ore Market.*—Messrs. Barrington & Holt report from Cartagena, Spain, under date of April 23, that prices are well maintained, and there is competition for the higher grade ores. Exports for the week were 370 tons blende to Swansea.

*Antimony* has been steady, with the demand nothing out of the ordinary. We quote Cookson's at 7½@8c.; Hallett's, 6½@6⅝; Hungarian, Japanese, French, Italian, U. S. and Chinese, 6¼@6⅜c.

*Nickel.*—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

*Platinum.*—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

*Quicksilver.*—The New York price is $45 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations continue at $44@$45 per flask for domestic orders, and about $41.50 for export. The London price is £8 5s. per flask, with the same quotation asked by second hands.

*Cadmium.*—Herr Paul Speier writes from Breslau, under date of April 30, as follows: Cadmium, guaranteed 99.5% metal, is very firm. For quantities of 500 kg. or over, quotations are 700@725 marks per 100 kg., f. o. b. Hamburg, net cash, packing included.

*Manganese.*—Herr Paul Speier reports, under date of April 30, that metallic manganese, best quality, is quoted at 360 marks per 100 kg., f. o. b. Bremen. Manganese-tin alloy, 55%, is quoted at 365 marks per 100 kg. for first quality, and 225 marks for second quality, both f. o. b. Bremen.

*Thallium.*—Herr Paul Speier writes under date of April 30 that thallium is quiet. The price is 60@65 marks per kg., at Breslau, cash terms.

*Minor Metals and Alloys.*—Wholesale prices, f. o. b. works, are as follows:

| Aluminum | Per lb | | Per lb |
|---|---|---|---|
| No. 1, 98% ingots | 33@37c. | Ferro-chromium (74%) | 12½c. |
| No. 2, 90% ingots | 31@34c. | Ferro-Tungsten (87½) | 38c. |
| Rolled Sheets | 4c. up | Magnesium, pure (N. Y.) | 60c. |
| Alum-bronze | 20@23c. | Manganese | $2.75 |
| Nickel-alum | 34@39c. | Mangan'e Cop. (20% Mn) | 32c. |
| Bismuth | $2.10 | Mangan'e Cop. (30% Mn) | 38c. |
| Chromium, pure (N. Y.) | 80c. | Molybdenum (Best) | $2.00 |
| Copper, red oxide | 50c. | Phosphorus, foreign | 45c. |
| Ferro-Molybde'm (50%) | $1.25 | Phosphorus, American | 70c. |
| Ferro-Titanium (10%) | 90c. | Sodium metal | 50c |
| Ferro-Titanium (20@25%) N. Y. | 55c. | Tungsten (Best) | 88c. |

Variations in price depend chiefly on size of order.

## Missouri Ore Market. May 7.

*(From Our Special Correspondent.)*

The highest price paid for zinc concentrates for the week was $39 per ton, 50c. less than the previous week; but the assay basis was unchanged at $34@$36 per ton of 60% zinc. For several weeks now the price has alternated between $39 and $39.50 for the highest price, the assay basis remaining the same, which means practically unchanged prices. A year ago zinc was $41 per ton for the choicest bins.

Lead concentrates were in the usual demand at $58 per ton for the ninth consecutive week. This is $3.50 per ton higher than a year ago.

Shipments from the district were as follows, for the week:

| | Zinc lbs. | Lead lbs. | Value. |
|---|---|---|---|
| Joplin | 2,774,330 | 352,630 | $60,160 |
| Webb City-Carterville | 2,612,730 | 417,920 | 53,715 |
| Duenweg | 1,161,150 | 259,840 | 27,145 |
| Galena-Empire | 739,100 | 144,780 | 16,075 |
| Alba-Neck | 865,860 | ..... | 15,585 |
| Cranby | 551,000 | 34,500 | 8,085 |
| Carthage | 370,750 | ..... | 6,490 |
| Prosperity | 341,360 | 11,500 | 6,475 |
| Badger | 338,120 | ..... | 5,750 |
| Zincite | 283,300 | ..... | 5,100 |
| Carl Junction | 183,600 | 5,670 | 3,560 |
| Aurora | 225,000 | 5,300 | 3,450 |
| Oronogo | 168,310 | ..... | 2,975 |
| Reeds | 104,500 | ..... | 1,775 |
| Mitchell | 97,590 | ..... | 1,900 |
| Central City | 52,480 | 22,190 | 1,380 |
| Beef Branch | 26,350 | 51,890 | 1,370 |
| Diamond | 66,350 | ..... | 1,125 |
| Spurgeon | 78,940 | 10,030 | 930 |
| Totals | 11,030,820 | 1,316,250 | $223,045 |
| 19 weeks | 193,727,850 | 24,140,930 | $3,916,450 |

Zinc value, the week, $185,625; 19 weeks, $3,238,925.
Lead value, the week, $37,420; 19 weeks, $677,525.

The shipment of zinc was an increase of 574 tons over the previous week. The lead sales were increased 21 tons and the value $19,635. Compared with a year ago, the increase in zinc ore shipments was 1,057 tons, but the lead shipments were a decrease of 112 tons, the value being $20,528 greater.

### Average Prices of Metals per lb., New York.

| Mo. | Tin. | | Lead. | | Spelter. | |
|---|---|---|---|---|---|---|
| | 1903. | 1904. | 1903. | 1904. | 1903. | 1904. |
| Jan... | 28.33 | 28.845 | 4.075 | 4.347 | 4.865 | 4.863 |
| Feb.. | 29.43 | 28.087 | 4.075 | 4.375 | 5.043 | 4.916 |
| Mar.. | 30.15 | 28.317 | 4.442 | 4.475 | 5.349 | 5.057 |
| April. | 29.81 | 28.132 | 4.567 | 4.475 | 5.550 | 5.219 |
| May . | 29.51 | ..... | 4.325 | ..... | 5.639 | .... |
| June . | 28.34 | ..... | 4.210 | ..... | 5.697 | .... |
| July.. | 27.68 | ..... | 4.075 | ..... | 5.662 | .... |
| Aug.. | 28.29 | ..... | 4.075 | ..... | 5.725 | .... |
| Sept.. | 26.77 | .... | 4.243 | ..... | 5.686 | .... |
| Oct... | 25.92 | ..... | 4.375 | ..... | 5.510 | .... |
| Nov.. | 25.42 | ..... | 4.218 | ..... | 5.338 | .... |
| Dec... | 27.41 | ..... | 4.162 | ..... | 4.731 | .... |
| Year | 28.09 | ..... | 4.237 | ..... | 5.400 | .... |

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February 4.717c.; March, 4.841c.; April, 5,038c.

### Average Prices of Copper.

| Mo. | New York. | | | | London. | |
|---|---|---|---|---|---|---|
| | Electrolytic. | | Lake. | | Standard. | |
| | 1903. | 1904. | 1903. | 1904. | 1903. | 1904. |
| Jan... | 12.159 | 12.410 | 12.361 | 12.553 | 53.52 | 57.55 |
| Feb... | 12.778 | 12.063 | 12.901 | 12.245 | 57.34 | 56.57 |
| Mar.. | 14.416 | 12.299 | 14.572 | 12 551 | 63.85 | 57.321 |
| April. | 14.454 | 12.923 | 14.642 | 13.120 | 61.72 | 58.247 |
| May.. | 14.435 | ..... | 14.618 | ..... | 61.73 | ..... |
| June . | 13.942 | ..... | 14.212 | ..... | 57.30 | ..... |
| July.. | 13.094 | ..... | 13.341 | ..... | 58.64 | ..... |
| Aug.. | 12.962 | ..... | 13.159 | ..... | 58.44 | .... |
| Sept.. | 13.205 | ..... | 13.345 | ..... | 56.82 | ..... |
| Oct... | 12.801 | ..... | 12.954 | ..... | 55 60 | ..... |
| Nov.. | 12.617 | ..... | 12.813 | ..... | 56.30 | ..... |
| Dec. . | 11.952 | ..... | 12,084 | ..... | 56.36 | ..... |
| Year | 13.235 | ..... | 13.417 | ..... | 57.97 | ..... |

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

### Average Prices of Silver, per ounce Troy.

| Mo. | 1902. | | 1903 | | 1904. | |
|---|---|---|---|---|---|---|
| | London. Pence. | N. Y., Cents. | London Pence. | N. Y., Cents. | London, Pence. | N. Y., Cents. |
| Jan. . | 25.62 | 55.56 | 21.98 | 47.57 | 26 423 | 57.055 |
| Feb. . | 25.41 | 55.09 | 22.11 | 47.89 | 26.665 | 57.592 |
| Mar. . | 25.00 | 54.23 | 22.49 | 48.72 | 26,164 | 56,741 |
| April. | 24.34 | 52.72 | 23.38 | 50.56 | 24.974 | 54.202 |
| May.. | 23.71 | 51.31 | 24.89 | 54.11 | ..... | ..... |
| June . | 24.17 | 52.36 | 24.29 | 52.86 | ..... | ..... |
| July.. | 24.38 | 52.88 | 24.86 | 53.92 | ..... | ..... |
| Aug.. | 24.23 | 52.52 | 25.63 | 55.36 | ..... | ..... |
| Sept.. | 23.88 | 51.52 | 26.75 | 58.00 | ..... | ..... |
| Oct... | 23.40 | 50.57 | 27.89 | 60.36 | ..... | ..... |
| Nov.. | 22.70 | 49.07 | 27.01 | 58.11 | ..... | ..... |
| Dec... | 22.21 | 48.03 | 25.73 | 55.375 | ..... | ..... |
| Year | 24.09 | 52.16 | 24.75 | 53.57 | ..... | ..... |

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

Variations in price depend chiefly on size of order.

## DIVIDENDS.

| Company. | Latest Dividend. Payable. | Rate. | Total. | Total to date. |
|---|---|---|---|---|
| †Amalgamated Cop'r. | May31 | .50 | $769,460 | $24,278,276 |
| ‡Anaconda Copper | May 19 | .50 | 600,000 | 23,850,000 |
| De Lamar, Idaho | May 16 | .36 | 24,184 | 2,764,524 |
| Greene Con. Copper | May 25 | .30 | 259,200 | 911,020 |
| Iron Silver, Colo. | June 1 | .10 | 50,000 | 3,000,000 |
| *Kendall, Mont. | May 20 | 0.5 | 25,000 | 455,000 |
| *Lightner, Cal. | May 20 | .05 | 5,113 | 212,180 |
| *Mines Co. of Am. | May 20 | .01¼ | 25,000 | 580,000 |
| *Natividad, Mex. | May 15 | 5.00 | 12,000 | 332,463 |
| Ophir, Nev. | May 5 | .50 | 50,400 | 1,747,000 |
| *Penna. Con., Cal. | May 15 | .10 | 5,150 | 212,825 |
| †Sovereign Oil, Cal. | May 15 | .01¼ | 6,250 | 6,250 |
| Sterling Oil, Cal. | May 15 | .06 | 1,500 | 1,500 |

* Monthly. † Quarterly. ‡ Semi-annually.

## ASSESSMENTS.

| Company. | Delinquent. | Sale. | Amount. |
|---|---|---|---|
| Annandale, Utah | May 16 | June 7 | $0.00½ |
| Belmont, Utah | May 7 | June 5 | .10 |
| Caledonia, Nev. | May 31 | June 21 | .15 |
| Con. Cal. & Va., Nev. | May 20 | June 10 | .25 |
| Emerald, Utah | May 16 | June 7 | .00½ |
| Galena, Utah | May 7 | May 28 | .02 |
| Good Hope, Utah | May 19 | June 11 | .03½ |
| Hale & Norcross, Nev. | May 31 | June 24 | .10 |
| Johnny, Utah | May 9 | June 9 | .06 |
| Las Goteras, Mex. | May 21 | ..... | .06 |
| New Red Wing, Utah. | May 5 | May 25 | .01 |
| Skylark Copper, Utah. | June 15 | July 5 | .01 |
| Utah Con., Nev. | June 6 | June 27 | .10 |
| Utah Mont., Utah | May 26 | June 10 | .01 |
| Victor, Utah | May 11 | May 28 | .01½ |
| Wabash, Utah | May 23 | June 14 | .05 |

# STOCK QUOTATIONS

## NEW YORK.

| Company. | Par val. | May 4 H. | May 4 L. | May 5 H. | May 5 L. | May 6 H. | May 6 L. | May 7 H. | May 7 L. | May 9 H. | May 9 L. | May 10 H. | May 10 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| †Amalgamated, c. | $100 | 47⅜ | 47 | 48¼ | 47⅛ | 48 | 47⅝ | 47⅜ | 47⅛ | 48 | 47⅜ | 48¼ | 47⅜ | 53,935 |
| Anaconda, c. | 25 | | | 76 | | 76¼ | | 76 | | 75½ | 75 | 75¾ | 74 | 1,300 |
| Anaconda, g. | 5 | | | 12 | | 12 | | | | | | | | 300 |
| Andes, s. | 1 | 27 | | | | | | | | | | 22 | | 700 |
| Best & Belcher, s. | 3 | | | | | | | | | 1.70 | | | | 100 |
| Bullion, s. | 1 | | | 9 | | | | | | | | | | 300 |
| Caledonia, s. | 1 | | | | | | | | | 75 | | | | 300 |
| Chollar, s., g. | 2½ | | | | | | | 21 | | | | | | 200 |
| C. K. & N., g. | 1 | | | | | | | | | | | 24 | | 500 |
| Con.Cal.&Va., g.s. | 2½ | 1.55 | | | | 1.65 | | 1.55 | 1.50 | 1.85 | 1.80 | 1.40 | | 1,240 |
| Con. Imperial | | | | | | | | | | | | 3 | 2 | 1,000 |
| Creede & Crip. Cr. | | | | 3 | | | | | | | | | | 500 |
| Cripple Creek, g. | 1 | | | | | 9 | 8 | | | | | 9 | | 2,500 |
| Crown Point | 1 | 18 | | | | | | | | | | | | 500 |
| Elkton, g. | 1 | | | | | | | | | | | 7 | | 400 |
| El Paso, g | 1 | | | | | | | | | 83 | | | | 500 |
| Gould & Carry | 1 | | | | | 18 | | | | | | | | 200 |
| Greene Con., c. | 10 | 16⅛ | 15⅞ | 16 | 15⅞ | 15⅞ | 15¾ | 15⅝ | 15⅝ | 15⅞ | 15⅝ | 15¾ | 15½ | 10,462 |
| Hale & Norcross | 3 | 65 | | | | | | 55 | | | | 65 | | 400 |
| Homestake, g. | 100 | | | | | | | | | | | | | |
| Horn Silver | 20 | | | | | | | | | | | | | |
| Isabella, g. | 1 | 33 | 32 | | | 33 | | | | | | 32 | | 2,000 |
| Jack Pot, g. | 1 | | | | | | | | | | | | | |
| Little Chief, g. s. | 50 | 6 | | 6 | | | | | | | | | | 350 |
| Mexican, s. | 3 | | | 2.00 | | 2.00 | | | | 2.00 | | | | 300 |
| Mollie Gibson, g. | 5 | | | | | | | | | | | 4½ | | |
| Moon Anchor, q. | 5 | | | | | | | | | | | | | |
| Occidental, s. | 3 | | | | | | | | | | | | | |
| Ontario, s. l. | 100 | | | 4.75 | | | | | | 4.75 | | | | 30 |
| Ophir, s. | 3 | 5.50 | | | | | | 5.50 | 5.37½ | 5.50 | | 5.25 | | 900 |
| Overman, s. | 2 | | | | | 26 | 25 | | | | | | | 400 |
| Pharmacist, g. | 1 | | | | | | | | | 4 | | 5 | 4 | 2,500 |
| Phœnix, g. | 1 | 11 | | 9 | | 8 | | | | | | | | 1,000 |
| Portland, g. | 1 | 1.65 | | 1.65 | | | | 1.65 | 1.60 | 1.70 | 1.65 | | | 700 |
| Potosi, s. | 1 | 19 | | 18 | | 17 | | | | 16 | | | | 900 |
| Quicksilver, Pf. | 100 | | | | | | | | | | | | | |
| Savage, s. | 3 | | | 3½ | | | | | | | | | | 100 |
| Sierra Nevada, s. | 3 | | | 55 | | | | | | | | | | 200 |
| Silver Hill, g. s. | 1 | | | | | | | | | 64 | | | | 200 |
| StandardCon.,g.s. | 10 | | | | | | | | | | | | | |
| Tennessee, c. | 25 | | | | | | | | | | | | | |
| Union Con., g. s. | 1 | | | | | | | | | | | | | |
| Union Copper | 10 | | | 5/8 | | | | | | | | | | 200 |
| White Knob, c. | 10 | | | 7¼ | | | | | | | | 7½ | | 115 |
| Work, g. | 1 | | | | | | | | | | | | | |

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 119,785 shares.
†Ex-dividend.

## BOSTON, MASS.

| Company. | Par val | May 4 H. | May 4 L. | May 5 H. | May 5 L. | May 6 H. | May 6 L. | May 7 H. | May 7 L. | May 9 H. | May 9 L. | May 10 H. | May 10 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AdventureCon.,c | $25 | 2 | | | | | | 2⅛ | | 2 | | | | 45 |
| Allouez, c. | 25 | 5 3/16 | 5 | 5¼ | 5 1/16 | 5 | | | | 5 | | 6⅛ | 5 | 1,313 |
| †Amalgamated,c. | 100 | 47⅜ | 47 | 48¼ | 47½ | 48 | 47⅜ | 47¾ | 47⅜ | 48 | 47½ | 48 | 47¼ | 9,922 |
| Anaconda, c. s. | 25 | | | | | | | | | | | | | |
| Arcadian, c. | 25 | | | | | | | 40 | | | | | | 120 |
| Arnold, c. | 25 | | | | | | | | | | | | | 100 |
| Atlantic, c. | 25 | 7⅛ | | 8 | 7⅛ | 8 | | | | | | 8 | | 339 |
| Bingham Con. | 50 | 21 | | | | 21⅛ | | | | | | 22 | | 160 |
| Bonanza Dev. g. | 10 | | | | | 41 | 40 | | | | | | | 500 |
| Calumet & Hecla | 25 | 467½ | | | | | | 462 | | | | 4-5 | | 4 |
| Centennial, c | 25 | 20 | 19¼ | 20⅛ | 19⅞ | 20¾ | 19⅜ | 20⅞ | 20⅛ | 20⅛ | 20¼ | 20⅝ | 28 | 6,103 |
| †Central Oil | 25 | | | | | 8¾ | 8 | | | | | 9 | 8⅛ | 510 |
| Con. Mercur, g. | 5 | 35 | | 34 | 33 | | | | | 35 | | 34 | 32 | 4,200 |
| Copper Range | 100 | 44 | 43¾ | 44⅛ | 43½ | 43⅛ | 42⅞ | 43⅛ | 43 | 43¾ | 43 | 43 | 41½ | 8,288 |
| Crescent | 10 | | | | | | | | | | | | | |
| Daly West, g. s. | 20 | 22 | 21⅞ | 22½ | 22 | 23 | 22¼ | 22¼ | 22 | 22¾ | 22 | 22½ | 21½ | 1,444 |
| Dominion Coal | 100 | | | 66 | | 65½ | | | | | | 66¾ | 66½ | 150 |
| Preferred | | | | | | | | | | | | 111 | | 15 |
| Dominion I. & S. | 100 | 10 | 9⅛ | | | 10¾ | 10¼ | 12 | | 11¾ | 11⅛ | 12 | 11¾ | 1,055 |
| Elm River, c. | 12 | | | | | | | | | 2½ | | | | 200 |
| Franklin, c. | 25 | | | | | | | | | 7½ | | 7⅛ | | 195 |
| Granby Con. | 10 | 4 1/16 | 4 | 4 | 4¾ | 4 | | 3⅞ | 3¾ | 3 1/16 | 3 1/16 | 3 1/16 | | 16,301 |
| Guanajuato Con. | 5 | 1¾ | | | | | | | | | | 1¾ | | 300 |
| Isle Royal Con. | 25 | 7 | | | | | | | | | | 7 | | 145 |
| Mass Con., c. | 25 | | | | | | | | | 4 | | 4 | | 35 |
| Mayflower, c. | 25 | | | | | 60 | | | | 60 | | | | 150 |
| Michigan, c. | 25 | | | 4⅛ | 4 | 4 | | | | 4 | | 4 | | 740 |
| Mohawk, c. | 25 | 42 | 41⅝ | 42¾ | 42¼ | 42¼ | 41¾ | 42¼ | | 42 | | 42 | | 835 |
| Mont. Coal & C. | 25 | 2½ | | | | | | | | | | | | 100 |
| Mont'l & Boston. | 5 | | | | | 60 | | | | 80 | | | | 75 |
| New Idria, q. | 5 | | | | | | | 10 | | | | | | 200 |
| Old Colony, c. | 25 | | | | | 1 | | | | | | 1 | | 200 |
| Old Dominion, c. | 25 | | | | | | | 13 | | | | | | 100 |
| Osceola, c. | 25 | 57½ | 56½ | 57½ | 56½ | 57¼ | | 57 | | 57 | 56½ | 56¾ | | 589 |
| Parrot, s. c. | 10 | | | 24¾ | 24 | 24¼ | 23½ | 24½ | | 24⅛ | 23¾ | 23¼ | 23 | 1,715 |
| Phœnix Con, c. | 25 | | | | | | | 1¾ | | 2 | 1½ | | | 285 |
| Quincy, c. | 25 | | | | | 82 | | 82 | 81 | 81 | 80⅜ | 80⅜ | | 121 |
| Rhode Island, c. | 25 | | | | | | | | | | | | | |
| Santa Fe, g. c | 10 | 1½ | | 1½ | | 1½ | 1¾ | | | | | 1¼ | | 530 |
| Shannon, c. | 10 | 8 | 7⅛ | 7⅜ | 7⅛ | 7⅜ | 7½ | 7⅜ | 7⅛ | 7½ | 7⅛ | 7½ | 7⅜ | 3,350 |
| Tamarack, c. | 25 | | | | | | | | | | | | | |
| Trinity, c. | 25 | | | 4 | 3⅞ | 4 | 3¾ | | | 4 | 3¾ | 4 | | 950 |
| United States, g. | 10 | 20⅛ | 19⅞ | 20⅛ | 20 | 20¼ | 20 | | | 20 | 19⅝ | | | 1,290 |
| U. S. Coal & Oil | 25 | | | | | 9¼ | | | | | | 9¾ | | 250 |
| Utah Con., g. c. | 5 | 33¾ | 33⅛ | 34¼ | 33⅞ | 34 | 33½ | 34 | | 34 | | 34 | 33½ | 2,297 |
| Victoria, c. | 25 | 3 1/16 | | | | 3 1/16 | 3 | 3 1/16 | | 3⅛ | | 3 1/16 | 3 | 545 |
| Winona, c. | 25 | 6¼ | | 6¼ | 6¼ | 6½ | | | | 6⅜ | | 6¼ | | 555 |
| Wolverine, c. | 25 | | | 71¾ | | | | | | 71 | | 71 | | 58 |
| Wyandot, c. | 25 | | | 60 | | | | 65 | | 75 | 60 | | | 815 |

c—Copper g—Gold. l—Lead. q—Quicksilver. s—Silver. Total sales, 65,931 shares.

## COAL, IRON AND INDUSTRIAL STOCKS.

| Company. | Par val. | May 4 H. | May 4 L. | May 5 H. | May 5 L. | May 6 H. | May 6 L. | May 7 H. | May 7 L. | May 8 H. | May 8 L. | May 10 H. | May 10 L. | Sale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allis-Chalmers | $100 | | | | | | | | | | | 6½ | 6 | 400 |
| Preferred | 100 | | | 40 | | | | | | 42 | | | | 400 |
| Am. Agr. Chem | 100 | | | | | | | | | | | | | |
| Preferred | 100 | | | | | | | | | | | | | |
| Am. Sm. & Ref. | 100 | | | 48¾ | | 49 | | 49 | | 49⅝ | 49 | 49⅝ | 49½ | 1,050 |
| Preferred | 100 | | | 95 | 94¾ | 95⅞ | 95 | 95½ | | 95½ | 95¼ | 95 | | 1,789 |
| Col. Fuel & I. | 100 | | | 32¼ | 31 | 32¼ | 30½ | 31 | | 31¾ | | | | 1,310 |
| Preferred | 100 | | | | | | | | | | | | | |
| Col. & H. C. & I. | 100 | | | | | | | | | 12 | 11 | | | 60 |
| Crucible Steel | 100 | 47⅛ | 43¾ | 5 | 47⅛ | 5 | | | | | | | | 570 |
| Preferred | | 3½¼ | 35¼ | 37⅝ | 36½ | 37¾ | 37 | 38¼ | | 47⅛ | | | | 1,072 |
| General Chem | | | | | | | | | | | | | | |
| Preferred | | 91 | | | | | | | | | | | | 100 |
| Mong. R. Coal | 50 | | | | | 8 | | 8 | | | | | | 519 |
| Preferred | 50 | | | 26 | | | | | | | | 25¾ | | 9 |
| National Lead | 100 | | | 17¼ | 16⅜ | 18⅝ | 17⅝ | 19¼ | 18¾ | 18⅞ | 18⅝ | 18¾ | 17½ | 5,900 |
| Preferred | 100 | | | 90 | | 90 | | 90½ | 90 | | | 92 | | 510 |
| Phila. Nat. Gas | 100 | | | 38⅞ | | | | | | | | 38¾ | | 65 |
| Pittsburg Coal | 100 | 16 | | | | 15¾ | | | | 15⅜ | 15½ | 15⅝ | 15½ | 775 |
| Preferred | 100 | 57 | 56¾ | 57 | 56½ | 56⅜ | 56 | 57 | 55¾ | 57¼ | 57 | | | 1,075 |
| Republic I. & S. | 100 | | | 6¾ | | | | | | 6¾ | | 6¾ | | 250 |
| Preferred | 100 | | | 42 | 41⅝ | 41½ | 41 | 41½ | 40⅝ | 40⅞ | 40⅝ | 40⅞ | 40½ | 2,532 |
| Sloss-Shef S. & I. | 100 | | | | | | | | | | | | | |
| Preferred | | | | | | | | | | 83½ | 83 | 82 | | 370 |
| Standard Oil | 100 | 625 | | 625 | | 626 | 625 | 626 | 625 | 626½ | 625 | 626 | 624½ | 214 |
| Tenn. C.I. & R.R. | 100 | 35½ | 35¾ | 35½ | 36⅝ | 35½ | | 35 | | 35¾ | 35 | 35½ | | 1,820 |
| U.S. Red. & Ref. | 100 | | | | | | | | | | | | | |
| U.S.Steel Corp. | 100 | 10½ | 9⅞ | 10½ | 10 | 10⅜ | | 10⅜ | | 10 | | 10 | | 20,470 |
| Preferred | 100 | 55⅜ | 54¾ | 55⅝ | 55½ | 55⅝ | 55¼ | 55⅜ | 55⅛ | 55½ | 55 | 55½ | 55 | 96,354 |
| Va.-Car Chem. | 100 | 27½ | | | | 27¾ | 27½ | 27½ | | 27⅜ | | 27⅝ | | 775 |
| Preferred | 100 | 101 | | | | 101 | | | | 101½ | | | | 765 |

*Pittsburg exchanges; all others, New York. Total sales, 139,149.

## COLORADO SPRINGS, COLO.

| Company. | Par Val | Apr.30 H. | Apr.30 L. | May 2 H. | May 2 L. | May 3 H. | May 3 L. | May 4 H. | May 4 L. | May 5 H. | May 5 L. | May 6 H. | May 6 L. | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acacia | $1 | .06¼ | .05¼ | 0 | .05¾ | .06¼ | .06 | .06⅜ | .06⅛ | .06¼ | .06 | .06⅜ | .06 | 5,000 |
| Anaconda | 5 | .12¼ | | .12 | | .13½ | .12¼ | .13½ | .12 | .12½ | | .12½ | | |
| Colo. City & M. | 1 | .02⅞ | .02⅜ | .02¾ | .02½ | .02⅜ | .02¼ | .02¾ | .02⅜ | .02¾ | .02½ | .02⅜ | .02¼ | |
| C. K. & N. | 1 | .25 | | .25¼ | | .30 | .25½ | .30 | .25 | .27 | .25½ | .27½ | .26 | 1,500 |
| Cripple Ck. Con. | 1 | .08 | .07⅜ | .07⅞ | .07¼ | .07⅝ | .07¼ | .08 | .07⅝ | .08 | .07¾ | .08 | .07⅞ | 8,000 |
| Des Moines | 1 | .02 | .01½ | .01½ | | .02½ | .01½ | .02½ | .01½ | .02¼ | .01¾ | .02¼ | .01½ | |
| Doctor-Jack Pot. | 1 | .04¾ | .04⅜ | .04⅜ | .04¼ | .04⅜ | .04¼ | .04¾ | .04⅜ | .04⅜ | .04¼ | .05 | .04⅝ | 16,000 |
| Elkton Con. | 1 | .67¼ | .63 | .67¼ | .67 | .67¼ | .67 | .67 | .66¾ | .67⅜ | .67¼ | .67½ | .66¾ | 15,000 |
| El Paso | 1 | .84½ | .83 | .86 | .84¾ | .85½ | .85 | .85¾ | .85¼ | .86 | .85½ | .86 | .85¾ | 10,200 |
| Gold Dollar Con. | 1 | .05½ | .05¼ | .05⅝ | .05¼ | .05½ | .05¼ | .05½ | .05⅜ | .05⅝ | .05½ | .05¾ | .05 | 1,700 |
| Gold Sovereign | 1 | .06⅛ | .03⅜ | .07⅜ | .03¼ | .04¾ | .06⅛ | .06⅛ | .06 | .06¼ | .06 | .06¼ | .06 | 25,000 |
| Golden Cycle | 1 | .45½ | .45 | .50 | .45 | .50 | .45 | .50 | .45 | .45¾ | .45 | .45 | | 4,500 |
| Golden Fleece | 1 | .02 | | .02 | | .02 | | .02 | | .02 | | .02 | | |
| Hart | 1 | .02 | | .02 | | .02 | | .02½ | | .02½ | | .02¾ | | |
| Isabella | 1 | .32 | .31½ | .32½ | .31½ | .33 | .31½ | .35 | .30¾ | .33 | .30½ | .32¼ | .30¾ | 3,050 |
| Jack Pot | 1 | .09 | .05 | .09 | .05 | .09 | .05½ | .09 | .06 | .05¾ | | .09 | .05 | |
| Keystone | 1 | .04⅜ | .04½ | .05 | .04 | .04⅜ | .04¼ | .04½ | .04¼ | .04½ | .04¼ | .05 | .04¼ | |
| Last Dollar | 1 | .40 | | .40 | | .40 | | .40 | | .40 | | .40 | | |
| Lexington | 1 | .04½ | .04 | .04½ | .04 | .04½ | .03¾ | .04½ | .04 | .04½ | .03¾ | .04 | .03¾ | 1,000 |
| Little Puck | 1 | .03½ | .03½ | .03½ | .03¾ | .03½ | .03⅜ | .03⅜ | .03¼ | .03¾ | .03¼ | .03¾ | .03¼ | 13,000 |
| Mollie Gibson | 1 | .05½ | .05 | .05½ | .05 | .05½ | .05 | .05½ | .05 | .05½ | .05 | .05½ | .05 | |
| Moon-Anchor | 5 | .09 | .08 | .09 | .08 | .08½ | | .09½ | .08¾ | .09 | .08½ | .09 | .08 | 3,000 |
| New Haven | 5 | .03⅜ | .03¼ | .03⅜ | .03 | .03⅜ | | .03½ | .03 | .03½ | .02¼ | .03¼ | .03 | |
| Old Gold | 1 | .10¼ | .09½ | .10¾ | .09¼ | .10 | .09¾ | .09¾ | .09⅛ | .10 | .09¾ | .10 | .09 | 8,000 |
| Pharmacist | 1 | .04 | .03¾ | .04 | .03¾ | .04 | .03¾ | .04 | .03⅞ | .04 | .03⅞ | .04 | .03¾ | 14,000 |
| Pinnacle | 1 | .03 | | .03 | | .03 | | .03 | | .03 | | .03 | | |
| Portland | 1 | 1.80 | | 1.80 | 1.68 | 1.80 | 1.68 | 1.80 | 1.68 | 1.80 | 1.65 | 1.74 | 1.70 | 2,100 |
| Vindicator Con. | 1 | .75 | .65 | .75 | .74 | .80 | | .67 | .66 | .76 | | .76 | .66 | 500 |
| Work | 1 | .07¼ | .06⅞ | .07½ | .03⅜ | .07⅛ | .06¾ | .07 | .0 9⅜ | .07 | .06⅜ | .07 | .06⅜ | 6,000 |

Total sales, 137,550 shares.

## SAN FRANCISCO.

| Company. | Location. | Apr. 28 H. | Apr. 28 L. | Apr. 29 H. | Apr. 29 L. | Apr. 30 H. | Apr. 30 L. | May 2 H. | May 2 L. | May 3 H. | May 3 L. | May 4 H. | May 4 L. | Sale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Golden Anchor | Nev. | | | .20 | | | | | | | | .32 | | 300 |
| MacNamara | Nev. | .20 | .19 | .20 | | .20 | | .19 | | .20 | .19 | | | 11,100 |
| Mont. Tonopah | Nev. | 1.52½ | 1.50 | 1.55 | 1.50 | 1.55 | 1.52½ | 1.55 | | 1.52½ | | 1.52½ | | 9,050 |
| Ton. Belmont | Nev. | .70 | .68 | .71 | .69 | .70 | | .71 | | .71 | | .69 | | 9,150 |
| Ton. Midway | Cal. | .41 | | .39 | | .39 | | | | .38 | | .38 | | 2,144 |
| Ton. Mg. Co. | Nev. | 9.37½ | | 9.50 | | | | | | | | 9.62½ | | 600 |
| Ton. North Star | Nev. | .30 | | .30 | | | | | | .30 | | | | 1,000 |

*San Francisco & Tonopah Mining Exchange.
Total sales, 33,344 shares.

## SAN FRANCISCO (By Telegraph).

| Company. | May 9. | May 10. | Name of Company. | May 9. | May 10. |
|---|---|---|---|---|---|
| Belcher | .26 | .24 | Gould & Curry | .20 | .18 |
| Best & Belcher | 1.60 | 1.50 | Hale & Norcross | .60 | .50 |
| Caledonia | .63 | .60 | Mexican | 1.90 | 1.80 |
| Challenge Con. | .18 | .22 | Ophir | 5.25 | 5.12½ |
| Chollar | .21 | .17 | Overman | .29 | .27 |
| Confidence | 1.05 | 1.10 | Sierra Nevada | .43 | .43 |
| Con. California & Virginia | 1.50 | 1.45 | Union Con | .70 | .65 |
| Crown Point | .19 | .19 | Yellow Jacket | .20 | .18 |

## COLORADO SPRINGS (By Telegraph).

| Company. | May 9 H. | May 9 L. | May 10 H. | May 10 L. | Company. | May 9 H. | May 9 L. | May 10 H. | May 10 L. |
|---|---|---|---|---|---|---|---|---|---|
| Anaconda | .13 | .12 | .13 | .12 | Jack Pot | .09 | .05 | .09 | .05 |
| Cripple Ck Con. | .08 | .07½ | .08 | .07¾ | Last Dollar | .40 | .30 | .40 | .30 |
| C. K. & N. | .30 | .25¾ | .29½ | .28½ | Mollie Gibson | .05¾ | .05 | .05¾ | .05 |
| Doctor-Jack Pot | .05 | .04¾ | .05¼ | .05 | Moon Anchor | .09 | .08 | .09 | .08 |
| Elkton Con | .67½ | .67 | .67½ | .67 | Old Gold | .10 | .09¼ | .09⅞ | .09 |
| El Paso | .85½ | .85 | .85 | .84½ | Pharmacist | .04⅜ | .04⅛ | .04¼ | .04 |
| Gold Dollar Con. | .05¼ | .05 | .05½ | .05 | Portland | 1.80 | 1.70 | 1.75 | 1.70 |
| Gold Sovereign | .0½ | .06¼ | .08½ | .08¾ | Vindicator | .75 | .67½ | .75 | .67½ |
| Isabella | .32 | .30 | .33 | .30 | Work | .07¼ | .07 | .07¾ | .07¼ |

## PHILADELPHIA, PA

| Company. | Par val. | May 4 H. | May 4 L. | May 5 H. | May 5 L. | May 6 H. | May 6 L. | May 7 H. | May 7 L. | May 9 H. | May 9 L. | May 10 H. | May 10 L. | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Am. Cement | $10 | 7¾ | | | | | | | | | | | | 150 |
| Cambria Iron | 50 | 48 | | | | | | | | 46 | | 46½ | | 64 |
| Cambria Steel | 50 | 19¾ | 19⅝ | | | 19¾ | | 20 | | 19⅞ | 19¾ | 19⅞ | | 847 |
| Susq. I. & S. | 5 | ¾ | | | | | | | | | | | | 100 |
| United Gas I. | 50 | 84 | | 84 | | 84 | | 84 | | 84 | | 83¾ | 83½ | 695 |
| *Lehigh Nav. | 50 | 74¼ | 74⅛ | 75 | 74½ | 74½ | | 74¾ | 74½ | | | 74⅛ | | 556 |
| Philadelphia | 50 | 39 | | 39 | 38⅞ | | | 39 | | 38½ | | 39⅞ | | 346 |
| U.S. Steel | 100 | 10⅜ | 9⅞ | 10 | | 10¼ | 10 | | | 10 | | 10 | | 1,820 |
| U.S. Steel pf. | 100 | 55¼ | 54⅞ | 55⅛ | 55⅜ | 55⅝ | | 55¼ | | 55¼ | 55 | 55⅜ | 55 | 4,180 |

*Ex-dividend. Total sales 8,668.

# STOCK QUOTATIONS

## ST. LOUIS, MO.* May 7

| Name. | Par Val. | Prices. Bid. | Ask. | Name. | Par Val. | Prices. Bid. | Ask. |
|---|---|---|---|---|---|---|---|
| Am.-Nettie, Colo.... | $10 | $0.15 | $0.25 | Columbia Lead, Mo. | $10 | $3.50 | $4.50 |
| Catherine Lead, Mo. | 10 | 1.40 | 2.50 | Con. Coal, Ill..... | 100 | 15.00 | 18.2[illegible] |
| Central Coal & C.... | 100 | 60.00 | 63.50 | Doe Run Lead Mo. | 100 | 110.00 | 115.00 |
| Central C. & C., pf.. | 100 | 70.00 | 72.00 | Granite Bimet, Mt.. | 10 | .35 | .3[illegible] |
| Central Lead, Mo... | 100 | 110.00 | 115.00 | St. Joe Lead, Mo,... | 10 | 15.00 | 17.00 |

*By our Special Correspondent.

## SALT LAKE CITY.* May 7

| Company | Par Val | High | Low | Sales. | Name of Company | Par Val | High | Low | Sales. |
|---|---|---|---|---|---|---|---|---|---|
| Butler Liberal. | 1 | .12⅜ | .12¼ | 3,600 | L. Mammoth.. | ½ | .21 | .20 | 1,70[illegible] |
| Carisa..... | 1 | .07½ | .07½ | 800 | May Day..... | 1 | .05½ | .05¼ | 18,10[illegible] |
| Century..... | 1 | .73½ | .72 | 400 | Manhattan..... | .... | .00¾ | .00¾ | 6,00[illegible] |
| Con. Mercur... | 5 | .35½ | .33 | 2,600 | N. Y. Bonanza | 5 | .14 | .10 | 11,70[illegible] |
| Daly..... | 20 | 2.60 | 2.60 | 300 | Sacramento.... | .... | .16 | .14⅞ | 10,00[illegible] |
| Daly-Judge.... | .... | 4.75 | 4.75 | 10 | Silver Shield... | 1 | .01¼ | .01⅜ | 5,50[illegible] |
| Daly West.... | ½ | 22 50 | 21.15 | 1,062 | Star Con..... | 1 | .14 | .12¼ | 4,25[illegible] |
| Grand Central. | 1 | 4.75 | 4.50 | 1,000 | Swansea..... | .... | .30 | .30 | 200 |
| Ingot..... | .... | ¾ | ¾ | 3,000 | Tetro..... | 1 | .27½ | .24½ | 9,400 |
| La Reine..... | .... | .05½ | .05 | 17,500 | Uncle Sam, Con | 1 | .19¾ | .17½ | 5,000 |
| Little Chief.... | .... | .01⅝ | .01⅜ | 5,500 | Victor, Con.... | .... | .01 | .01 | 2,00[illegible] |
| ..... | .... | ..... | ..... | ..... | Yankee Con.... | 1 | .38½ | .37 | 1,100 |

*By our Special Correspondent. All mines are in Utah. Total sales, 110,722 shares.

## Duluth, Minn.

| Company | Par Val. | Bid. | Asked. | Company | Par Val. | Bid. | Asked. |
|---|---|---|---|---|---|---|---|
| Calumet & Arizona..... | $10 | $105 | $107 | Lake Sup. & Pitts Dev.. | $10 | $150 | $155 |
| Calumet & Bisbee..... | 10 | 3.00 | 4.50 | Pitts. & Duluth Dev.... | 15 | 38.00 | 40.00 |
| Calumet & Cochise..... | 10 | 5.00 | 5.50 | Shakespeare..... | 10 | ..... | .20 |
| Calumet & Pittsburg... | 10 | 30.00 | 32.00 | United Mexican..... | 10 | ..... | .50 |
| Higgins Development.. | 10 | 2.00 | 2.50 | Wolverine & Arizona... | 10 | 3.50 | ..... |
| Junction Development | 15 | 20.00 | 21.00 | Yaqui..... | 10 | ..... | 1.00 |

## TORONTO, ONT. May 7

| Company. | Par val | Prices. High. | Low. | Company. | Par val | Prices. High. | Low. |
|---|---|---|---|---|---|---|---|
| Black Tail, g..... | $1 | ..... | ..... | Mountain Lion, g..... | $1 | ..... | ..... |
| Cariboo-McKin..... | 1 | ..... | ..... | Payne, s. l..... | 1 | .13 | .08 |
| Cariboo-Hydr..... | 1 | ..... | ..... | Rambler Carib..... | 1 | .28 | .22 |
| Center Star, g. s..... | 1 | .28 | .25½ | St. Eugene, g. s..... | 1 | .43 | .42 |
| ..... | .... | ..... | ..... | War Eagle Con..... | 1 | .14 | .10 |
| ..... | .... | ..... | ..... | White Bear..... | 1 | .04½ | .03½ |

g—Gold. l—Lead. s—Silver.

## MEXICO. April 29

| Company. | Shares Issued | Prices, Mex. Bid. | Ask. | Company. | Shares Issued. | Prices, Mex. Bid. | Ask. |
|---|---|---|---|---|---|---|---|
| **Durango:** | | | | Trompillo..... | 1,200 | $1,700 | $1,730 |
| Ca. Min. de Penoles.. | 2,500 | $3,500 | $3,700 | San Rafael y An., aviada..... | 1,200 | 690 | 700 |
| San Andres de la Sierra..... | 200 | 10,000 | ..... | Soledad, aviada..... | 670 | 690 | 700 |
| **Guanajuato:** | | | | Sorpresa, aviada..... | 960 | 270 | 280 |
| Angustias, Pozos.... | 2,400 | 40 | 42 | **Mexico:** | | | |
| Cinco Senores y An., aviadoras..... | 2,000 | 40 | 42 | Alacran..... | 2,400 | 20 | 28 |
| Cinco Senores y An., aviada..... | 400 | 40 | 42 | Aldebarren..... | 2,000 | 22 | 28 |
| Providencia, San Juan de la Luz..... | 6,000 | 67 | 70 | Buen Despacho..... | 3,000 | 37 | 40 |
| Queensland y Australia..... | 300 | 45 | 55 | Dos Estrellas..... | 3,000 | 1,700 | 1,725 |
| **Guerrero:** | | | | La Esperanza (El Oro.)..... | 3,000 | 1,500 | 1,500 |
| Delfina, 1st serie..... | 2,500 | 45 | 50 | La Reformia, aviadores..... | 2,000 | 17 | 20 |
| Delfina, 2nd serie.... | 2,500 | 35 | 40 | Santa Ana, Esperanza..... | 2,400 | 90 | ..... |
| Garduno y Anexas... | 7,200 | 30 | 40 | **Michoacan:** | | | |
| **Hidalgo:** | | | | Luz de Borda, aviadora..... | 3,000 | 50 | 55 |
| Amistad y Condordia | 9,600 | 78½ | 80 | Luz de Borda, aviado..... | 1,000 | 20 | 25 |
| Carmen, aviada..... | 1,100 | 50 | 90 | Santiago y An., Tlal.. | 4,000 | 3 | 5 |
| Guadalupe Fresnilio Mill..... | 1,000 | 170 | 200 | **Nuevo Leon:** | | | |
| Guadalupe Fresnilio Mine..... | 1,400 | 70 | 80 | La Fraternal..... | 1,000 | 580 | 620 |
| La Reina y An., aviadora..... | 5,600 | 5 | 7 | Norias de Bajan..... | 1,000 | 880 | 920 |
| Luz de Maravillas, aviadas..... | 1,100 | ..... | 20 | **San Luis Potosi:** | | | |
| Maravillas y An., aviador..... | 1,680 | 120 | 140 | Concepcion y An..... | 3,000 | 78 | 85 |
| Maravillas el Lobo.. | 1,000 | 130 | 180 | El Barreno, aviadora. | 2,000 | 66 | 70 |
| Palma y An., aviador..... | 1,800 | 8 | 16 | Sta. Maria de la Paz.. | 9,800 | 190 | 192 |
| Refugio, aviada..... | 12,800 | 680 | 740 | San Diegoy Annexas. | 2,400 | 8 | 10 |
| Santa Anay An., aviadora..... | 1,800 | 50 | 60 | **Zacatecas:** | | | |
| Santa Anay An., aviada..... | 600 | 25 | 35 | Asturiana y An..... | 2,500 | 20 | 30 |
| Sta. Gertrudis y An., aviadas..... | 9,600 | 13 | 15 | Candelaria y Pinos.. | 2,500 | 80 | 110 |
| Sta. Gertrudis y An., aviadora..... | 28,800 | 82 | 82½ | Esperanza y An..... | 2,400 | 6 | 8 |
| Santo Tomas Apostol aviadoras..... | 5,100 | 2 | 3 | Lourdes..... | 2,500 | 22 | 27 |
| San Felipe de Jesus, aviadora..... | 3,600 | 23 | 24 | Luz de Minillas, pagadoras..... | 2,000 | 15 | 30 |
| San Felipe de Jesus, aviada..... | 1,200 | 6 | 10 | Nueva Quebradilla, aviadoras..... | 2,400 | 35 | 50 |
| San Rafael y An., | | | | Nueva Quebradilla, aviadas..... | 600 | 30 | 40 |
| | | | | San Carlos y Annexas | 2,500 | 58 | 65 |
| | | | | Sta. Maria de Gaud.. | 2,500 | 55 | 60 |
| | | | | **Miscellaneous:** | | | |
| | | | | Bartolome de Medina | 2,000 | 83 | 85 |
| | | | | Naica (Chihuahua.).. | 100 | 11,000 | 13,000 |
| | | | | Natividad (Oaxaca) aviadora..... | 1,800 | 950 | 100 |
| | | | | San Francisco Hac... | 6,000 | 73 | 75 |
| | | | | Union Hacienda..... | 3,000 | 270 | 285 |

## LONDON. April 29

| Company. | Shares Issued. | Par value. | Latest dividend. Amt. | Date. | Quotations. Buyers. | Sellers. |
|---|---|---|---|---|---|---|
| | | £. s. d. | s. d. | | £ s. d. | £ s. d. |
| American: | | | | | | |
| *Alaska-Treadwell..... | 200,000 | 5 0 0 | 1 6 | Apr., 1904 | 4 12 6 | 4 17 6 |
| Anaconda..... | 1,200,000 | 5 0 0 | 2 0 | May, 1904 | 4 2 6 | 4 5 0 |
| Camp Bird..... | 820,000 | 1 0 0 | 9 | May, 1904 | 1 5 0 | 1 6 3 |
| Copiapo..... | 112,500 | 2 0 0 | 6 10 | May, 1903 | 1 0 0 | 1 5 0 |
| De Lamar..... | 80,000 | 1 0 0 | 1 6 | May, 1904 | 11 3 | 13 9 |
| El Oro..... | 1,080,000 | 1 0 0 | 9 | Jan., 1904 | 1 2 6 | 1 5 0 |
| Frontino & Bolivia.... | 128,682 | 1 0 0 | 3 0 | July, 1901 | 7 6 | 10 0 |
| Le Roi..... | 200,000 | 5 0 0 | 5 0 | Nov., 1899 | 1 3 9 | 1 6 3 |
| Le Roi No. 2..... | 120,000 | 5 0 0 | 1 0 | Feb. 1904 | 16 3 | 18 9 |
| Montana..... | 657,128 | 1 0 0 | 6 | April, 1899 | 9 | 1 0 |
| Palmarejo & Mexican... | 445,000 | 1 0 0 | rts. | April, 1903 | 7 3 | 7 9 |
| Standard..... | 500,000 | 4 0 | 2½ | Sept., 1903 | 1 6 | 2 6 |
| Stratton Independence. | 1,000,007 | 1 0 0 | 6 | Dec., 1903 | 4 0 | 4 6 |
| St. John del Rey..... | 546,265 | 1 0 0 | 6 | Dec., 1903 | 11 6 | 12 6 |
| Tomboy..... | 300,000 | 1 0 0 | 1 0 | June, 1902 | 1 5 0 | 1 10 0 |
| Ymir..... | 200,000 | 1 0 0 | 1 0 | Mar., 1902 | 3 9 | 6 3 |
| European: | | | | | | |
| Linares..... | 15,000 | 3 0 0 | 5 0 | Apr., 1904 | 3 10 0 | 4 0 0 |
| Mason & Barry ..... | 185,172 | 1 0 0 | 7 0 | May, 1904 | 3 10 0 | 3 15 0 |
| Rio Tinto..... | 325,000 | 5 0 0 | 37 6 | May, 1904 | 54 0 0 | 54 5 0 |
| Rio Tinto, preferred.... | 325,000 | 5 0 0 | 2 6 | May, 1904 | 6 0 0 | 6 5 0 |
| Tharsis..... | 625,000 | 2 0 0 | 7 0 | May, 1904 | 4 15 0 | 5 0 0 |
| West Australian: | | | | | | |
| Associated..... | 495,388 | 1 0 0 | 2 0 | Jan., 1904 | 3 3 9 | 3 5 0 |
| *Cosmopolitan..... | 400,000 | 1 0 0 | 1 0 | Apr., 1904 | 13 6 | 14 0 |
| Golden Horseshoe..... | 300,000 | 5 0 0 | 6 0 | Apr., 1904 | 8 1 3 | 8 3 9 |
| Great Boulder..... | 1,750,000 | 2 0 | 9 | Mar., 1904 | 1 6 3 | 1 6 9 |
| Gt. Boulder Persever'ce | 1,400,007 | 1 0 0 | 1 3 | May, 1904 | 1 2 9 | 1 3 3 |
| Great Fingall..... | 250,000 | 1 0 0 | 7 0 | Apr., 1904 | 8 1 3 | 8 3 9 |
| *Ivanhoe..... | 200,000 | 5 0 0 | 7 6 | Apr., 1904 | 8 1 3 | 8 3 9 |
| Kalgurli..... | 120,000 | 1 0 0 | 2 6 | Apr., 1904 | 5 10 0 | 5 12 6 |
| Lake View ..... | 250,000 | 1 0 0 | rts. | Aug., 1902 | 1 6 3 | 1 8 9 |
| Oroya-Brownhill..... | 450,000 | 1 0 0 | 2 6 | Mar., 1904 | 3 10 0 | 3 11 3 |
| Miscellaneous: | | | | | | |
| *Brilliant Central ..... | 100,000 | 1 0 0 | 1 0 | May, 1904 | 2 17 6 | 3 2 6 |
| Brisels..... | 600,000 | 1 0 0 | .. .. | ..... | 8 0 | 9 0 |
| Broken Hill..... | 960,000 | 8 0 | 1 0 | May, 1904 | 1 13 9 | 1 15 0 |
| Mt. Lyell..... | 275,000 | 3 0 0 | 4 3 | Sept., 1903 | 16 6 | 17 6 |
| Mt. Morgan..... | 1,000,000 | 1 0 0 | 3 | May, 1904 | 2 7 6 | 2 10 0 |
| Waihi..... | 497,412 | 1 0 0 | 2 0 | May, 1904 | 5 11 3 | 5 13 9 |
| Indian: | | | | | | |
| Champion Reef..... | 513,832 | 10 0 | 1 3 | May, 1904 | 1 16 0 | 1 17 0 |
| Mysore..... | 566,043 | 10 0 | 5 6 | Mar., 1904 | 6 8 9 | 6 11 3 |
| Nundydroog..... | 484,000 | 10 0 | 1 8 | Mar., 1904 | 1 12 6 | 1 15 0 |
| *Ooregum..... | 343,000 | 10 0 | 1 3 | Apr., 1904 | 18 9 | 1 1 3 |
| *Ooregum, pfd..... | 240,000 | 10 0 | 1 3 | Apr., 1904 | 1 8 9 | 1 11 3 |
| South African: | | | | | | |
| Angelo..... | 600,000 | 1 0 0 | 4 0 | Feb., 1904 | 6 15 0 | 7 0 0 |
| Bonanza..... | 200,000 | 1 0 0 | 10 0 | Feb., 1904 | 1 6 3 | 1 8 9 |
| British South Africa.... | 4,436,019 | 1 0 0 | rts. | May, 1899 | 2 2 11 | 2 4 1 |
| Cape Copper..... | 300,000 | 2 0 0 | 4 0 | Jan., 1904 | 3 0 0 | 3 5 0 |
| Cape Copper, pfd..... | 75,000 | 2 0 0 | 1 9 | Jan., 1904 | 2 17 6 | 3 2 6 |
| City & Suburban ..... | 340,000 | 4 0 0 | 8 0 | Feb., 1904 | 6 17 6 | 7 0 0 |
| Consol. Gold-Fields..... | 2,000,000 | 1 0 0 | .. .. | ..... | 6 17 6 | 6 18 9 |
| Crown Reef..... | 120,000 | 1 0 0 | 18 0 | Apr., 1904 | 16 0 0 | 16 10 0 |
| De Beers, preferred.... | 800,000 | 2 10 0 | 10 0 | Jan., 1904 | 18 8 9 | 18 11 3 |
| De Beers, deferred..... | 1,000,000 | 2 10 0 | 15 0 | Jan., 1904 | 19 6 3 | 19 8 9 |
| East Rand..... | 930,000 | 1 0 0 | 5 0 | Aug., 1903 | 7 17 6 | 8 0 0 |
| Ferreira..... | 90,000 | 1 0 0 | 3 0 | May, 1904 | 20 15 0 | 21 5 0 |
| Geldenhuis ..... | 200,000 | 1 0 0 | 6 0 | Feb., 1904 | 5 13 9 | 5 16 3 |
| Geduld..... | 400,000 | 1 0 0 | rts. | Mar., 1902 | 6 17 6 | 6 18 9 |
| Henry Nourse..... | 125,000 | 1 0 0 | 10 0 | Feb., 1904 | 8 15 0 | 9 0 0 |
| Jubilee..... | 50,000 | 1 0 0 | 5 0 | Feb., 1904 | 4 15 0 | 5 0 0 |
| Jumpers..... | 100,000 | 1 0 0 | 2 6 | May, 1904 | 3 7 6 | 3 12 6 |
| Langlaagte..... | 470,000 | 1 0 0 | 2 0 | Feb., 1904 | 3 18 9 | 4 1 3 |
| May..... | 288,750 | 1 0 0 | 3 6 | Feb., 1904 | 4 3 9 | 4 6 3 |
| Meyer & Charlton..... | 100,000 | 1 0 0 | 5 0 | Jan., 1904 | 5 12 6 | 5 17 6 |
| Modderfontein ..... | 290,000 | 1 0 0 | rts. | Apr., 1902 | 9 11 3 | 9 13 9 |
| Namaqua..... | 94,331 | 2 0 0 | 3 0 | Dec., 1903 | 3 10 0 | 3 15 0 |
| New Jagersfontein.. | 200,000 | 5 0 0 | 10 0 | June, 1904 | 28 5 0 | 28 15 0 |
| New Primrose..... | 325,000 | 1 0 0 | 3 0 | Mar., 1904 | 3 17 6 | 4 0 0 |
| Rand..... | 1,795,956 | 5 0 | 4 0 | Aug., 1902 | 10 12 6 | 10 15 0 |
| Robinson..... | 750,000 | 5 0 0 | 5 6 | Feb., 1904 | 10 0 0 | 10 5 0 |
| Robinson Deep..... | 950,000 | 1 0 0 | 3 0 | Jan., 1904 | 5 10 0 | 5 12 6 |
| Rose Deep ..... | 450,000 | 1 0 0 | 2 6 | Feb., 1904 | 8 10 0 | 8 15 0 |
| Salisbury ..... | 60,000 | 1 0 0 | 2 0 | June, 1904 | 2 0 0 | 2 2 6 |
| Village..... | 400,000 | 1 0 0 | 3 0 | Feb., 1904 | 7 1 3 | 7 3 0 |
| Wemmer ..... | 80,000 | 1 0 0 | 10 0 | Jan., 1904 | 11 0 0 | 11 5 9 |

*Ex-dividend.

## LONDON (By Cable.)*

| Company. | May 4 £. | s. | d. | May 11 £. | s. | d. | Company. | May 4 £. | s. | d. | May 11 £. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anaconda..... | 4 | 0 | 0 | 3 | 15 | 0 | El Oro..... | 1 | 3 | 9 | 1 | 3 | 1½ |
| British So. Africa. | 2 | 2 | 6 | 2 | 2 | 6 | Modderfontein.... | 9 | 13 | 9 | 5 | 3 | 9 |
| Camp Bird..... | 1 | 6 | 3 | 1 | 6 | 6 | Rand Mines..... | 10 | 12 | 6 | 10 | 8 | 9 |
| Con. Gold Fields. | 6 | 15 | 0 | 6 | 15 | 0 | Rio Tinto..... | †52 | 7 | 6 | 51 | 10 | 0 |
| De Beers..... | 18 | 17 | 6 | 13 | 0 | 0 | Simmer & Jack... | 1 | 14 | 4½ | 1 | 7 | 1½ |
| East Rand..... | 8 | 1 | 10 | 7 | 13 | 9 | Tomboy..... | 1 | 6 | 3 | 1 | 6 | 3 |

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York. †Ex-dividend.

## PARIS. April 21

| Company. | Location. | Capital Stock. Francs. | Par value. Fr. | Latest divs. Fr. | Prices. Opening. Fr. | Closing. Fr. |
|---|---|---|---|---|---|---|
| Anzin, Coal..... | France ..... | ..... | ..... | 220.00 | 5,595.00 | 5,600.00 |
| Boleo, c..... | Lower Cal.... | 12,000,000 | 500 | 62.50 | 1,887.00 | 1,894.00 |
| Champ d'Or, g..... | S. Africa..... | 3,375,000 | 25 | 3.75 | 19.50 | 19.50 |
| Courrieres, Coal..... | France ..... | 600,000 | 500 | 110.00 | 2,790.00 | 2,790.00 |
| Fraser River, g..... | Brit. Col..... | 250,000 | 25 | ..... | 5.50 | 5.50 |
| Huanchaca, s..... | Bolivia..... | 40,000,000 | 125 | 2.50 | 97.50 | 88.50 |
| Laurium, z. l.... | Greece..... | 16,300,000 | 500 | 25.00 | 320.00 | 320.00 |
| Malfidano, z..... | Italy ..... | 12,500,000 | 500 | 50.00 | 598.00 | 593.00 |
| Metaux, Cie. Fran. de..... | France ..... | 25,000,000 | 500 | 22.50 | 480.00 | 470.00 |
| Mokta-el-Hadid, i. l..... | Algeria ..... | 18,312,000 | 500 | 40.00 | 870.00 | 875.00 |
| Nickel, n..... | N. Caledonia.. | 15,000,000 | 250 | 22.50 | 560.00 | 555.00 |
| Penarroya, Coal ..... | Spain..... | ..... | 500 | 45.00 | 1,095.00 | 1,080.00 |
| Vielle Montagne z..... | Belgium..... | 9,000,000 | 30 | 30.00 | 705.00 | 700.00 |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... |

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.